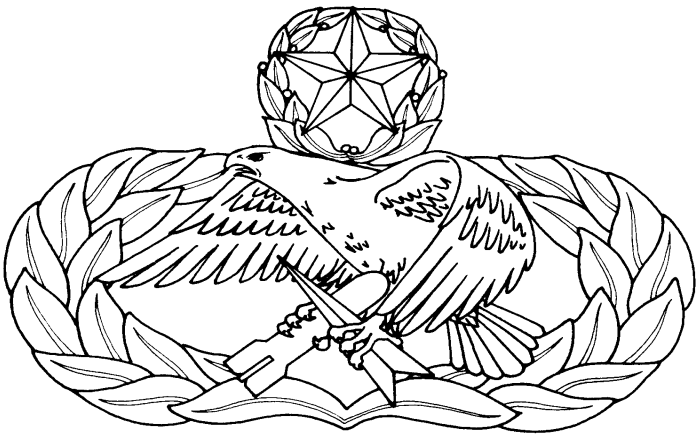
DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington, DC 20330-1030

CFETP 2E6X2
Parts I and II
1 October 2002

AFSC 2E6X2

COMMUNICATIONS CABLE AND ANTENNA SYSTEMS



CAREER FIELD EDUCATION AND TRAINING PLAN

COMMUNICATIONS CABLE AND ANTENNA SYSTEMS
AFSC 2E6X2
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TABLE OF CONTENTS

Supersedes CFETP 2E6X2, Parts I and II, 1 November 2001 Number of Printed Pages: 86
Certified by: HQ USAF/ILC Brig Gen Bernard K Skoch
OPR: HQ USAF/ILCXD, CMSgt Watlington
Editors: HQ AFCA/GCLV CMSgt Showers; 364 TRS/TRR, TSgt Garcia;
81 TRSS Qualification Training Flight, TSgt Rivera

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PART I

Preface

1. Resource constraints in the Air Force are impacting the availability of our most valuable resource--people. This condition, which will continue to exist in the future, makes it essential for the work force to be effectively and efficiently trained to perform duties within each skill level of an Air Force Specialty (AFS). To meet the challenges of tomorrow the Air Force must place a greater emphasis on career field training. This Career Field Education and Training Plan (CFETP) is a management tool that enables the Air Force and each MAJCOM to place the needed emphasis on total career field training. It provides the framework and guidance necessary to plan and develop a career field training program. The plan, which is a "training road map" for the career field, identifies mandatory and optional training requirements. It includes initial skills, upgrade, and continuation training that individuals should receive during their career in this specialty.

2. The CFETP, which documents the career field training program, consists of two parts. Management uses both parts to plan, manage, and control training within the career field.

2.1. Part I, Section A, provides the information necessary for overall management of training in the career field. It contains administrative details and explains the purpose and use of the CFETP. Section B provides a description of the specialty, suggests career field progression, provides career field information, documents training decisions, defines each skill level, and identifies MAJCOM continuation training options. Section C specifies qualification requirements for upgrade/progression in each subsequent skill level in the career field. It also identifies sources of training other than those provided by the Air Education and Training Command (AETC). Section D identifies known resource constraints.

2.2. Part II of the CFETP contains the Specialty Training Standard (STS) and identifies the various training sources and courses available to members of the specialty. The STS is comprised of the Course Training Standard (CTS) and the Career Training Guide (CTG). The CTS includes the tasks and knowledge requirements for award of the three skill level. The CTG includes task and knowledge requirements for upgrade/progression to subsequent skill levels in the career field and identifies career development course (CDC) subject content. Supervisors and trainers at the unit level use Part I, Section C, and Part II of the CFETP to identify, plan, and conduct unit level training commensurate with the overall goals of this plan.

3. Use of the guidance provided in this CFETP ensures individuals in this career field receive effective and efficient training at the appropriate points in their careers. This plan enables the Air Force to train today's work force for tomorrow's jobs.

Abbreviations/Terms Explained

This section provides a common understanding of the terms that apply to the Communications Cable And Antenna Systems Career Field and Education Training Plan.

Advanced Training. A formal course of training that leads to a technical or supervisory level of an AFS. Training is for selected airmen at the advanced level of an AFS.

Air Education Training Command (AETC). Responsible for the recruiting, training and education of Air Force personnel. AETC also provides pre-commissioning, professional military, and continuing education.

Air Force Career Field Manager (AFCFM). Representative appointed by the respective HQ USAF Deputy Chief of Staff or Under Secretariat to ensure that assigned AF specialties are trained and utilized to support AF mission requirements.

Air Force Institute for Advanced Distributed Learning (AFIADL). The result of a merger between the Air Force Distance Learning Office and the Extension Course Institute (ECI).

Air Force Job Qualification Standard (AFJQS). A comprehensive task list that describes a particular job type or duty position. Supervisors use the AFJQS to document task qualification. The tasks on AFJQSs are common to all persons serving in the described duty position.

Air Force Qualification Training Package (AFQTP). An instructional course designed for use at the unit to qualify or aid qualification in a duty position, program, or on a piece of equipment. It may be printed, computer-based, or other audiovisual media.

Air Force Specialty (AFS). A group of positions (with the same title and code) that require common qualifications.

Career Field Education and Training Plan (CFETP). A CFETP is a comprehensive core training document that identifies: life-cycle education and training requirements; training support resources, and minimum core task requirements for a specialty. The CFETP aims to give personnel a clear path and instill a sense of industry in career field training. CFETPs are officially posted at http://www.e-publishing.af.mil/.

Career Training Guide (CTG). A document that uses Task Modules (TM) in lieu of tasks to define performance and training requirements for a career field.

Certifying Official. A person assigned by the commander to determine an individual's ability to perform a task to the required standard.

Computer Based Training (CBT). A forum for training in which the student learns via a computer terminal. It is an especially effective training tool that allows the students to practice applications while they learn.

Continuation Training. Additional advanced training that exceeds the minimum upgrade training requirements and emphasizes present or future duty assignments.

Core Task. A task AFCFM's identify as a minimum qualification requirement for everyone within an AFSC, regardless of duty position. Core task may be specified for a particular skill level or in general across the AFSC. Guidance for using core task can be found in the applicable CFETP narrative.

Course Training Standard (CTS). A standard developed for all courses not governed by an STS, including specialized training packages and computer-based training courses.

Enlisted Specialty Training (EST). A mix of formal training (technical school) and informal training (on-the-job) to qualify and upgrade airmen in each skill level of a specialty.

Exportable Training. Additional training via computer assisted, paper text, interactive video, or other necessary means to supplement training.

Go/No Go. In OJT, it is the stage at which an individual has gained enough skill, knowledge, and experience to perform a task without supervision.

Initial Skills Training. A formal school course that results in an AFSC 3-skill level award for enlisted or mandatory training for upgrade to qualified officers.

Instructional System Development (ISD). A deliberate and orderly (but flexible) process for planning, developing, implementing, and managing instructional systems. It ensures personnel are taught in a cost efficient way the knowledge, skills, and attitudes essential for successful job performance.

Major Command (MAJCOM). A MAJCOM represents a major Air Force subdivision having a specific portion of the Air Force mission. Each MAJCOM is directly subordinate to HQ USAF. MAJCOMs are interrelated and complementary, providing offensive, defensive, and support elements.

Occupational Survey Report (OSR). A detailed report showing the results of an occupational survey of tasks performed within a particular AFSC.

On-the-Job Training (OJT). Hands-on, over-the-shoulder training conducted to certify personnel in both upgrade (skill level award) and job qualification (duty position certification) training.

Qualification Training. Actual hands-on, task performance based training designed to qualify airmen in a specific duty position. This training program occurs both during and after the upgrade training process and is designed to provide skills training required to do the job.

Resource Constraints. Resource deficiencies (such as money, facilities, time, manpower, and equipment) that preclude desired training from being delivered.

Skill Training. A formal course that results in the award of a skill level.

Specialty Training Package and COMSEC Qualification Training Package. A composite of lesson plans, test material, instructions, policy, doctrine, and procedures necessary to conduct training. These packages are prepared by AETC, approved by National Security Agency (NSA), and administered by qualified communications security (COMSEC) maintenance personnel.

Specialty Training Standard (STS). An Air Force publication that describes an Air Force specialty in terms of tasks and knowledge that an airman in that specialty may be expected to perform or to know on the job. Also identifies the training provided to achieve a 3-, 5-, or 7-skill level within an enlisted AFS. It further serves as a contract between AETC and the functional user to show which of the overall training requirements for an Air Force Specialty Code (AFSC) are taught in formal schools and correspondence courses.

Standard. An exact value, a physical entity, or an abstract concept established and defined by authority, custom, or common consent to serve as a reference, model, or rule in measuring quantities or qualities, establishing practices or procedures, or evaluating results. It is a fixed quantity or quality.

Task Module (TM). A group of tasks performed together within an AFSC that requires common knowledge, skills, and abilities. TMs are identified by an identification code and a statement.

Total Force. All collective components (active, reserve, guard, and civilian elements) of the United States Air Force.

Training Capability. The capability of a training setting to provide training on specified requirements, based on the availability of resources.

Training Planning Team (TPT). Comprised of the same personnel as a U&TW, TPTs are more intimately involved in training development and the range of issues examined is greater than in the U&TW forum.

Training Requirements Analysis (TRA). A detailed analysis of tasks for a particular AFSC to be included in the training decision process.

Training Setting. The type of forum in which training is provided (formal resident school, on-the-job, field training, mobile training team, self-study, etc.).

Upgrade Training. Training that leads to the award of a higher skill level.

Utilization and Training Pattern. A depiction of the training provided to and the jobs performed by personnel throughout their tenure within a career field or AFS. There are two types of patterns: 1)

Current pattern, which is based on the training provided to incumbents and the jobs to which they have been and are assigned; and 2) Alternate pattern, which considers proposed changes in manpower, personnel, and training policies.

Utilization and Training Workshop (U&TW). A forum of the AFCFM, MAJCOM functional managers, subject matter experts (SME), and AETC training personnel that determines career ladder training requirements.

Wartime Tasks. Those task that must be taught when courses are accelerated in a wartime environment. They are identified by an "*" in CFETP Part II, Section A, CTS. In response to a wartime scenario, these task will be taught in the 3- level course in a streamlined training environment. These task are only for those career fields that still need them applied to their schoolhouse tasks.

Section A - General Information

1. Purpose of the CFETP. This CFETP provides the information necessary for career field managers, training management, supervisors, and trainers to plan, develop, manage, and conduct an effective and efficient career field training program. The plan outlines the training that individuals should receive in order to develop and progress throughout their careers. For purposes of this plan, training is divided into three areas: initial skills, upgrade, and continuation training. Initial skills training is the AFS specific training an individual receives upon entry in the Air Force, normally conducted by AETC at one of the technical training centers. Upgrade training identifies the mandatory courses, task qualification requirements, and Career Development Course (CDC) completion required for award of the 5-, 7-, or 9-skill level. Continuation training is additional training provided to 3-, 5-, 7-, and 9-level personnel to increase their skills and knowledge beyond the minimum required for upgrade. The CFETP has several purposes, some of which are:

1.1. Serves as a management tool to plan, develop, manage, and conduct a career field training program. Also, ensures that established training is provided at the appropriate point in an individual's career.

1.2. Identifies task and knowledge training requirements for each skill level in the specialty and recommends training throughout each phase of an individual's career.

1.3. Lists training courses available in the specialty, identifies sources of the training, and provides the training medium.

1.4. Identifies major resource constraints that impact implementation of the desired career field training program.

2. Use of the CFETP. The CFETP is maintained by the Air Force Career Field Manager (AFCFM). MAJCOM Functional Managers and AETC review the plan annually to ensure currency and accuracy and forward recommended changes to the AFCFM. Using the list of courses in Part II, they determine whether duplicate training exists and take steps to eliminate/prevent duplicate efforts. Career field training managers at all levels use the plan to ensure a comprehensive and cohesive training program is available for each individual in the career ladder.

2.1. AETC training personnel develop/revise formal resident and exportable training based upon requirements established by the users and documented in the STS. They also develop procurement and acquisition strategies for obtaining resources needed to provide the identified training.

2.2. MAJCOM Functional Managers ensure their training programs complement the CFETP mandatory initial skill and upgrade requirements. They also identify the needed AFJQSs/AFQTPs to document unique upgrade and continuation training requirements. Requirements are satisfied through OJT, resident training, or exportable courseware/courses. MAJCOM developed training to support this AFSC must be identified for inclusion into this plan. Forward recommendations concerning this CFETP to your MAJCOM Functional Manager.

2.3. 81 TRSS Qualification Training Flight (Q-Flight) personnel develop AFJQSs/AFQTPs based on requests submitted by the MAJCOMs and according to the priorities assigned by the Communications-Electronics (C-E) Maintenance Training Advisory Group (MATAG) Working Group.

2.4. Unit level training managers and supervisors manage and control progression through the career field by ensuring individuals complete the mandatory training requirements for upgrade specified in this plan and supplemented by their MAJCOM. The list of courses in Part II is used as a reference for planning continuation or career enhancement training.

3. Coordination and Approval of the CFETP. The AFCFM is the approval authority. MAJCOM representatives and AETC training personnel coordinate on the career field training requirements. The AFCA executive agents reviews CFETPs for accuracy prior to submission for approval by the AFCFM.

Section B - Career Field Progression and Information

4. Specialty Description. This information supplements that presented in AFMAN 36-2108.

4.1. **Communications Cable And Antenna Systems Apprentice/Journeyman**.

4.1.1. Specialty Summary. Provides command and control (C2) capabilities through installation, maintenance, fault isolation, and reconstitution of fixed cable/wireless distribution systems, local area networks (LAN), and wide area networks (WAN) in support of tactical and strategic operations. Monitors and analyzes performance of underground, buried, and aerial cables and antenna networks. Related DoD Occupational Subgroup: 621.

4.1.2. Duties and Responsibilities:

4.1.2.1. Installs, maintains, repairs, removes, and modifies copper core and fiber optic cable systems and antenna systems. Climbs poles to install, splice, maintain, and repair aerial cables and terminals. Ensures cables are properly dried and protected from moisture. Uses drawings, task lists and instructions, and technical orders or commercial manuals to work on copper core, fiber optic, and aerial cable systems. Installs distribution equipment. Terminates copper core and fiber optic cables on main distribution frames and interface equipment. Installs and maintains dedicated local area network (LAN) and wide area network (WAN) media distribution systems including distribution system modems, multiplexers, and premise wiring. Installs, maintains, and repairs cable air dryers and continuous flow and static pressurization systems. Processes civil engineer work clearance requests. Operates and performs maintenance on tools, test equipment, auxiliary equipment, and vehicles such as backhoes, trenchers, cable trailers, and cable reel trucks. Performs safety tests on antenna support structures and equipment. Surveys, assembles, erects, and maintains antenna supports, including poles, guys, anchors, obstruction systems, and lightning protection devices. Installs and maintains equipment such as radomes, radiating and receiving elements, passive and active reflectors, electrical amplifiers, radio frequency coaxial cables, waveguides, pressurized transmission lines, and air dryers. Performs tests of electrical characteristics, such as insulation resistance, voltage, standing wave ratio, and antenna gain. Conducts inspections and preventive maintenance inspections on antenna and support structures. Ensures mechanical or electrical installations and maintenance techniques meet technical standards, specifications, and engineering directives. Operates and performs operator maintenance on tools, test equipment, auxiliary equipment, and vehicles such as backhoes, trenchers, cable trucks, and cable reel trailers.

4.1.2.2. Locates, repairs, and replaces faulty closures in copper core and fiber optic cable systems. Performs pneumatic troubleshooting to locate faulty splice closures and demi-valve assemblies. Excavates and backfills splice pits. Repairs demi-valves, and adjusts pressure transmitters and contactors. Installs, removes, and maintains telecommunications cable systems. Installs and maintains aerial cable support structures such as pole line and suspension strands. Loads and unloads cable reels and seals cable. Installs underground cable, uses duct rods, cleans cable duct systems, prepares pulling apparatus, and pulls in and temporarily bonds cable. Installs and maintains buried cable systems.

4.1.2.3. Monitors, analyzes, and troubleshoots copper core and fiber optic cable systems. Determines cause of signal deterioration in cable carrying audio, video, digital, and data transmission. Troubleshoots, repairs, and replaces T-carrier equipment, fiber optic modems, and components. Interprets compressor meter readings, and adjusts controls. Installs, maintains, and repairs or replaces damaged pneumatic and electrical components in cable air dryers. Uses test equipment to identify copper conductors and optic fibers in cables. Locates and traces buried cable. Locates and traces leaks in pressurized cable system. Performs operational checks and preventive maintenance inspection requirements.

4.1.2.4. Maintains communications and computer systems installation records (CSIRs), maintenance and inspection cable records, and technical orders. Recommends methods to improve test equipment, support equipment, vehicles, installation and maintenance procedures. Completes maintenance data collection forms. Maintains technical orders.

4.1.2.5. Processes civil engineering work clearance requests, installs buried radio frequency cable, and marks buried cable path to support the antenna systems. Inspects installation and maintenance techniques.

4.2. **Communications Cable And Antenna Systems Craftsman.**

4.2.1. Specialty Summary. Plans and schedules installation and maintenance actions on underground, buried, aerial copper core and fiber optic cables, supporting systems, and antenna systems for command, control, communications, and computers (C4). Related DoD Occupational Subgroup: 621.

4.2.2. Duties and Responsibilities.

4.2.2.1. Plans and schedules antenna and cable systems installation and maintenance actions. Resolves project installation and maintenance problems by interpreting project sketches, drawings, project directives, diagrams, CSIRs, and technical orders. Determines project installation and maintenance actions and repair procedures. Inventories project and work order materials. Initiates and conducts system verification tests to assess the capability and effectiveness of copper core, fiber optic cable systems, and antenna systems. Coordinates operations with using activities. Processes civil engineer work clearance requests. Operates and performs operator maintenance on tools, auxiliary equipment, test equipment, and vehicles such as backhoes, trenchers, cable trailers, and cable reel trucks.

4.2.2.2. Performs, inspects, and evaluates communications cable and antenna systems installation and maintenance actions. Installs, tests, removes, and splices aerial, buried, and underground copper core and fiber optic cables. Installs cable terminals and line balancing equipment. Installs and maintains dedicated LAN and WAN media distribution systems including distribution system modems, multiplexers, and premise wiring. Identifies, locates, and corrects electrical, lightwave, and pneumatic faults on copper core and fiber optic cable systems. Inspects antenna systems for operation, proper installation, and compliance with specifications. Evaluates inspection reports and analyzes survey and test results. Implements corrective action.

4.3. **Telephone and Distributed Communications Systems Superintendent.**

4.3.1. Specialty Summary. Superintends installation and maintenance actions on all antenna, cable and telephone systems supporting command, control, communications, and computer (C4).

4.3.2. Duties and Responsibilities. This specialty "caps" at the Senior Master Sergeant level with those personnel who came-up through the 2E6X2, and 2E6X3 career fields. Therefore, the duties and responsibilities defined below encompass the complete spectrum of these two specialties.

4.3.2.1. Plans, organizes, and directs antenna, cable, and telephone installation and maintenance activities. Develops and improves work methods and procedures related to installation and maintenance actions on all antenna, cable and telephone systems.

4.3.2.2. Directs antenna, cable, and telephone installation and maintenance activities. Assigns project priorities. Organizes work teams. Schedules installation and maintenance actions.

4.3.2.3. Inspects and evaluates antenna, cable, and telephone project and maintenance actions. Develops antenna, cable, and telephone systems organizational structure. Conducts inspection of antenna, cable, telephone systems, and construction activities for C4 systems. Evaluates work for compliance with standards. Evaluates inspector's findings and takes appropriate action. Interprets plans and specifications. Evaluates requirements for tools, test equipment, vehicles, manpower, and equipment.

4.4. **Communications-Electronics Chief Enlisted Manager**. This specialty "caps" at the Chief Master Sergeant Level with those specialties that came up through the 2E0XX, 2E1XX, 2E2XX, 2E3XX, and 2E6XX career ladders. Personnel attaining the rank of Chief are assigned broad ranging duties in directing and managing diverse functions such as activities that install, remove, relocate, repair, and maintain radar systems (air traffic control and aircraft control and warning), telephone systems, satellite, wideband and telemetry systems, ground radio systems, meteorological and navigation systems, visual, imagery and intrusion detection systems, computer, network, switching and cryptographic, and antenna and cable systems. Other challenges that these Chiefs face are assignments to the White House Communications Agency, Air Force Element at CENTCOM, the Air Force Communications Agency, Defense Information Systems Agency, NATO, etc.

4.5. The following are some of the more common missions you may encounter as a 2E6X2.

CABLE SYSTEMS

Underground Telephone Cable Installation

Splicing Operations

Buried Telephone Cable Installation

Confined Space Testing

Fiber Optic Cable Splicing

Pole Setting

ANTENNA SYSTEMS

Pole Clamp Installation

Self Supporting Tower Construction

Microwave dish removal

Parabolic Dish Installation on GP1 Tower

Microwave Dish Installation

5. Skill/Career Progression. Adequate training and timely progression from the apprentice to superintendent skill levels play an important role in the Air Force's ability to accomplish its mission. It is essential that everyone involved in training do their part to plan, manage, and conduct an effective training program. The guidance provided in this part of the CFETP and the 2E6X2 Education and Training Path table will ensure individuals receive viable training at appropriate points in their careers.

Apprentice (3-Level) Training
Upon completion of initial skills training a trainee will work with a trainer to enhance their knowledge and skills.
Utilize CDCs, AFJQSs/AFQTPs, and other exportable courses to progress in the field.
Once task certified, a trainee may perform the task unsupervised.
Journeyman (5-Level) Training
Enter into continuation training to broaden experience base.
Five-levels may be assigned job positions such as team leader and shift supervisor.
Attend the Airman Leadership School (ALS) after serving 48 months in the Air Force or selection to rank of SSgt (active duty only). In-residence or correspondence course is required for Air National Guard/Air Force Reserve Command (ANG/AFRC) personnel.
Use CDCs and other references identified by the AFCFM to prepare for Weighted Airman Performance Systems (WAPS) testing.
Should continue pursuing a Community College of the Air Force (CCAF) degree.
Craftsman (7-Level) Training
A seven-level can expect to fill various supervisory and management positions such as shift leader, team chief, supervisor, or task certifier.
Seven-levels should take courses or obtain added knowledge on management of resources and personnel and attend the 7-level resident course.
Encouraged continuing academic education through CCAF and higher degree programs.
Attend the Noncommissioned Officer Academy (NCOA). In-residence or correspondence course is required for ANG/AFRC personnel.
Superintendent (9-Level) Training
A nine-level can be expected to fill positions such as flight chief, superintendents, and various staff positions.
Should pursue increased knowledge for budget, manpower, resources, and personnel management.
Recommend they pursue additional education and completion of courses outside of their AFS.
Chief Enlisted Manager (CEM) Training
Must be selected for CMSgt and possess qualifications in a feeder specialty (2E190, 2E291, and 2E690).
CEMs work in a variety of similar jobs and functional areas where general managerial and supervisory abilities can be most effectively used and challenged.
Resident graduation of the USAF Senior NCO Academy (SNCOA) is a prerequisite for CMSgt sew-on (active duty only). In-residence or correspondence course required for ANG/AFRC personnel.

6. Training Decisions. This CFETP was developed to encapsulate an entire spectrum of training requirements for the Communications Cable and Antenna Systems career field, using a building block approach (simple to complex). Included in this spectrum was the strategy of when, where, and how to meet the training requirements. The strategy must be apparent and affordable to reduce duplication of training and eliminate a disjointed approach to training. The following decisions were made by members of the 19-20 Jan 2002 Utilization and Training Workshop.

6.1. Initial Skills. The initial skills course was reviewed and minor changes were made. The group Identified CTS items which will be implemented during wartime. The items identified in by "*" in the CTS will be taught when the course is directed to expedite training and provide personnel to the field. Additionally, performance based training on many of the more common tasks were changed to knowledge-based training and training on antenna systems was included. The group re-approved the following limitation. For schoolhouse purposes the requirement to instruct students on pole climbing and working aloft on an unstepped pole was limited to a height of 21 feet.

6.2. Five-Level Upgrade Requirements. The 5-level CDCs were revised to reflect changes in field equipment and add material on LAN/WANs. The current 5-level supplemental course was revalidated as required to fully support the career field. Skill requirements for 9-level upgrade were established through the C-E MATAG Working Group with AFQTP 2EXXX-201LB providing familiarization on the broad spectrum of communications equipment and systems. Upgrade requirements were updated to include eight standardized areas common to all career fields. The following list identifies the major areas covered: test equipment, standardized maintenance practices, computer security, standard installation practices, communication principles, expeditionary communications principles, information transport concepts, and electrical power systems. Additionally, a review of CDCs resulted in future development being restricted to six volumes. Development of this single set of CDCs will include three volumes which will be used by all 2EXXX career fields. The following table outlines 5-level CDC contents.

VOLUME 1	Electronic Principles (Computer Based Training)
VOLUME 2	Test Equipment
VOLUME 3	Communication Principles
VOLUME 4	AFSC Specific Information
VOLUME 5	AFSC Specific Information
VOLUME 6	AFSC Specific Information

6.3. Seven-Level Upgrade Requirements. Seven level training requirements were added to provide a common core of proficiency among all individuals in the 2EXXX arena. Training covers deployment concepts, system planning and implementation, and management principles.

6.4. Proficiency Training. This training is job qualification for an assigned duty position. Additional qualification training becomes necessary when personnel transfer to another duty position, the unit mission changes, a new personnel program comes on board, or any time changes in techniques or procedures occur.

6.5. Continuation Training: The purpose of the continuation training program is to provide additional advanced training, exceeding the minimum upgrade training requirements, with the emphasis on present and future duty positions. MAJCOMs may develop a continuation training program to ensure individuals in the career field receive the necessary training at the appropriate points in their careers. The training program will identify both mandatory and optional training requirements.

7. Community College of the Air Force (CCAF) Academic Programs. Enrollment in CCAF occurs upon completion of basic military training. CCAF provides the opportunity for all enlisted members to obtain an Associate in Applied Science degree. The degree must be completed before the student separates from the Air Force, retires, or is commissioned as an officer. In addition to its associates degree program, CCAF offers the following:

7.1. Occupational Instructor Certification. The College offers the Occupational Instructor Certification to instructors teaching full time in a CCAF affiliated school. To qualify, instructors must complete an instructor course, a teaching practicum, have two years teaching experience, hold an associate or higher degree, and be recommended by their commander/commandant.

7.2. Trade Skill Certification. When a CCAF student separates or retires, a trade skill certification is awarded for the primary occupational specialty. The College uses a competency based assessment process for trade skill certification at one of four proficiency levels-Apprentice, Journeyman, Craftsman/Supervisor, or Master Craftsman/Manager. All are transcribed on the CCAF transcript.

7.3. The Electronic Systems Technology (4VHP) program applies to 2EXXX career fields.

7.3.1. Degree Requirements: Individuals must hold the 5-skill level at the time of program completion.

	Semester hours
Technical Education	24
Leadership, Management, and Military Studies	6
Physical Education	4
General Education	15
Program Electives	15
Total	64

7.3.2. Technical Education (24 semester hours): A minimum of 12 semester hours of Technical Core subjects and courses must be applied and the remaining semester hours will be applied from Technical Core/Technical Elective subjects and courses.

7.3.3. Leadership, Management, and Military Studies (6 semester hours): Professional military education and/or civilian management courses. See CCAF General Catalog for application of civilian management courses.

7.3.4. Physical Education (4 semester hours): Satisfied upon completion of basic military training.

7.3.5. General Education (15 semester hours): Courses must meet the criteria for application of courses to the General Education requirement and be in agreement with the definitions of applicable General Education subjects/courses as outlined in the CCAF General Catalog.

7.3.6. Program Elective (15 semester hours): Satisfied with applicable Technical Education; Leadership, Management, and Military Studies; or General Education courses, including natural science courses meeting General Education requirement application criteria. Six semester hours of CCAF degree applicable technical credit otherwise not applicable to this program may be applied.

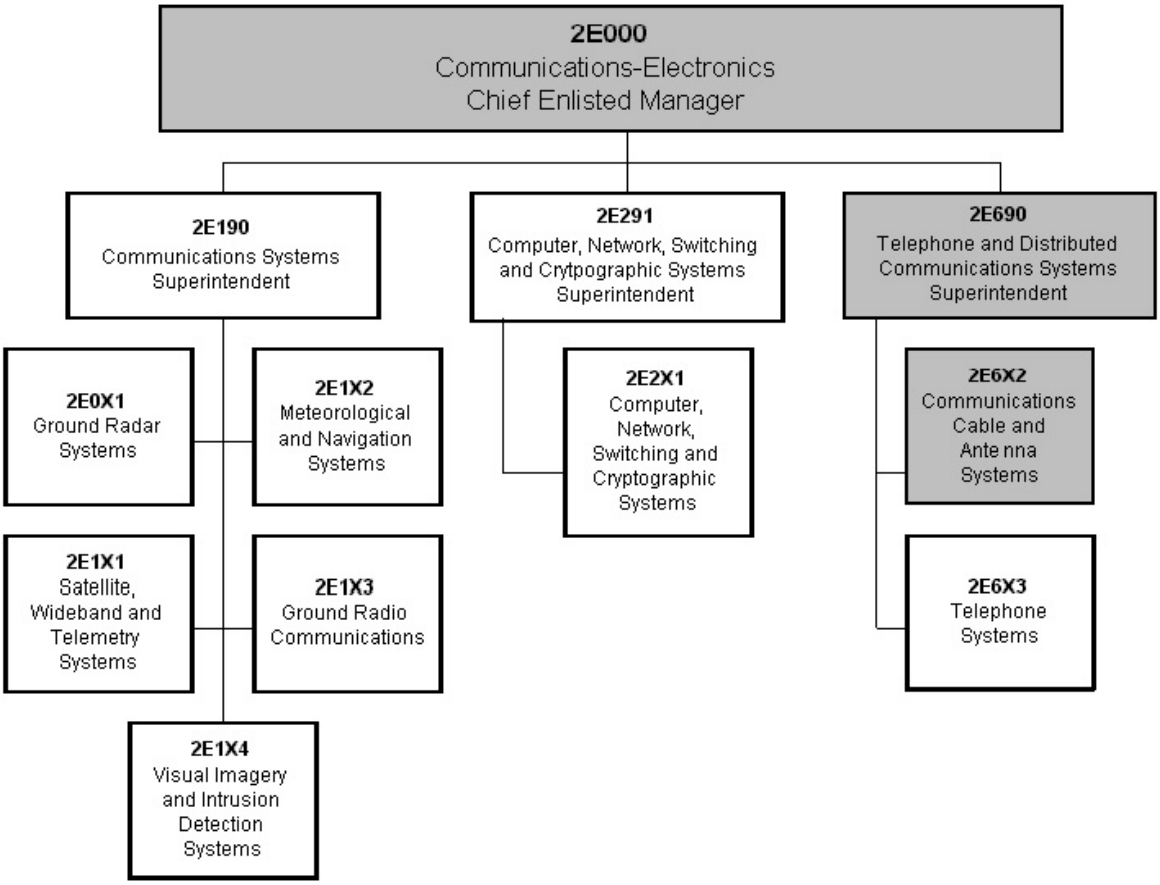
7.4. See the current CCAF General Catalog for details regarding the Associates of Applied Science in Electronic Systems Technology. The catalog is available at your education officer or from http://www.au.af.mil/au/ccaf.

7.5. Additional off-duty education is a personal choice that is encouraged for all. Individuals desiring to become an AETC instructor should be actively pursuing an associate degree. A degreed faculty is necessary to maintain CCAF's accreditation through the Southern Association of Colleges and Schools.

8. Career Field Path. The following summarizes career progression and personnel allocations across the career ladder. 2E6X2 and 2E6X3 personnel maintain their individual AFSC identifiers through the

rank of MSgt. Upon promotion to SMSgt, these AFSCs merge to become 2E690. At Chief, the 2E690 merges with other 2EXXX 9-level specialties to become a 2E000. Current demographic information is available on the Web at http:\\www.afpc.randolpf.af.mil/demographics/demograf/CAFSC.html.

2EXXX Career Field Progression



2E6X2 COMMUNICATIONS CABLE AND ANTENNA SYSTEMS EDUCATION AND TRAINING PATH	
EDUCATION AND TRAINING REQUIREMENTS	AVERAGE SEW ON TIME AND COMMENTS
BASIC MILITARY TRAINING SCHOOL	
APPRENTICE TECHNICAL SCHOOL (3-SKILL LEVEL)	Airman..... 6 months
UPGRADE TO JOURNEYMAN (5-SKILL LEVEL) Minimum 15 months OJT training (9 months for re-trainees). Completion of all 2E652 CTG core tasks and 5-Level CDCs.....Mandatory Specific AFJQSs/AFQTPs for equipment at assigned location. .....Mandatory Maintenance Management and Generic AFJQSs/AFQTPs for various unit level duties.....Mandatory AETC Supplemental training courses as determined by MAJCOM .....Optional AFETS/CFS/SMT training as determined by MAJCOM .....Optional	A1C ..... 16 months SrA ..... 3 years Earliest ..... 3 years HYT ..... 12 years
AIRMAN LEADERSHIP SCHOOL (ALS) Attendance is limited to SSgt selectees or those attaining 48 months Total Active Federal Military Service (TAFMS) and who have not been selected for promotion to SSgt. Completion is mandatory before assuming the rank of SSgt. ANG/AFRC may complete by correspondence course.....Mandatory	TRAINER: Qualified to perform the task to be trained; must attend the formal OJT Trainer Training; and appointed by the Commander. Refer to AFI 36-2201 Vol 3, Chap 6
UPGRADE TO CRAFTSMAN (7-SKILL LEVEL) Minimum rank of SSgt. 12 months OJT training (6 months for retrainees). Completion of all 2E672 CTG core tasks and AFQTP 2EXXX-201L, Communications-Electronics Work Center Manager's Handbook. Attendance at formal 7-level school. Must be 7-level to sew on TSgt.....Mandatory Maintenance Management and Generic AFJQSs/AFQTPs for various unit level duties.....Mandatory AETC Supplemental training courses as determined by MAJCOM.....Optional AFCA Systems Seminar at Scott AFB. Consult your MAJCOM for course quotas.....Optional AFETS/CFS/SMT training as determined by MAJCOM .....Optional	SSgt ..... 7.5 years Earliest ..... 3 years HYT ..... 20 years TSgt..... 12.5 years Earliest ..... 5 years HYT ..... 24 years CERTIFIER: Must be at least a SSgt (E-5) with a 5-skill level or civilian equivalent; attend the Air Force Training Course; be capable of evaluating the task being certified; evaluate training and certify qualifications. Refer to AFI 36-2201 Vol 3, Chap 6

2E6X2 COMMUNICATIONS CABLE AND ANTENNA SYSTEMS EDUCATION AND TRAINING PATH	
EDUCATION AND TRAINING REQUIREMENTS	AVERAGE SEW ON TIME AND COMMENTS
NONCOMMISSIONED OFFICER ACADEMY (NCOA). Attendance is limited to TSgt and TSgt selectees. Completion is mandatory before assuming the rank of MSgt. ANG/AFRC may attend in-residence as SSgt or TSgt or complete correspondence course. NCOA Correspondence Course.....Optional	MSgt..... 16 years Earliest ..... 8 years HYT ..... 26 years
USAF SENIOR NONCOMMISSIONED OFFICER ACADEMY (SNCOA) Attendance is limited to SMSgt, SMSgt selectees, and selected MSgts. Completion is mandatory before assuming the rank of CMSgt. .....Mandatory SNCOA Correspondence Course .....Optional ANG/AFRC may complete by correspondence course. ANG/AFRC MSgts may attend in-residence.....Mandatory	SMSgt ..... 19.2 years Earliest ..... 11 years HYT ..... 28 years
UPGRADE TO SUPERINTENDENT (9-SKILL LEVEL) Minimum rank of SMSgt. Complete AFQTP 2EXXX-201LB, Communications-Electronics Manager's Handbook. .....Mandatory Maintenance Management and Generic AFJQSs/AFQTPs for various unit level duties. .....Mandatory	CMSgt ..... 21.5 years Earliest ..... 14 years HYT ..... 30 years

NOTE 1: Published sew on times are Air Force averages. Refer to the Air Force Personnel Center's homepage to determine career field specific information: http://www.afpc.randolph.af.mil/eprom.

NOTE 2: See Part II, Section D for a list of AFJQSs/AFQTPs, AETC supplemental, and AFETS/CFS/SMT training.

NOTE 3: All core/duty position tasks must be completed prior to upgrade.

Section C - Skill Level Training Requirements

9. Purpose. The various skill levels in the career field are defined in terms of tasks and knowledge requirements for each skill level in the Communications Cable and Antenna Systems career field of the Communications-Electronics Systems career ladder. They are stated in broad, general terms and establish the standards of performance. An all-encompassing core task list has not been developed for this specialty because of the diversity of the missions supported and the equipment installed to meet mission requirements. Core tasks, knowledge items, and skill requirements for this specialty are identified in the STS, CDCs, AFJQSs/AFQTPs, etc. Completion of the mandatory 3-level skill awarding course, CDCs, 7-level course, and applicable AFJQSs/AFQTPs define the Air Force core tasks for this specialty.

10. Specialty Qualification Requirements.

10.1. **Apprentice (3-Level) Training.**

KNOWLEDGE	Installation and maintenance management functions; wire transmission principles; electrical and lightwave communications on aerial, buried and underground cable systems; hardened missile cable pressure and alarm systems Antenna and obstruction systems rectifiers, power supplies, motors, generators and servomechanisms; antenna fundamentals, including antenna theory and principles of rotators, amplifiers and control cables; antenna installation procedures, including radio frequency cable, waveguide splicing, and repair and maintenance techniques of radomes Operation and theory of cable pressurization, alarm systems, locating cable faults, identifying causes of deterioration in cable systems, cable testing procedures and methods of sealing cables Safety precautions related to oxygen deficiency, oxygen enrichment, toxic and explosive gases, working aloft, rescue procedures for aerial and underground environments, basic first aid and cardiopulmonary resuscitation Use and limitations of test set operations; corrosion prevention and control procedures; and capabilities, limitations, operations and functional use of basic cable and antenna systems and associated hardware.
EDUCATION	Completion of high school with courses in analytical mathematics is desirable.
TRAINING	Electronics Principles, course L3AQR2E632 331 (PDS Code PO3) (See Attachment 1 of the STS for course training standard) Communications Cable and Antenna Systems Apprentice, course J3ABR2E632 007 (PDS Code COA) (See Attachment 2 of the STS for course training standard)
EXPERIENCE	None required.

OTHER	Normal color vision is required for entry into this AFSC as defined by AFI 48-123, *Medical Examination and Standards*. Qualification to operate government vehicles according to AFI 24-301, *Vehicle Operations*. Normal depth perception and normal gait and balance is mandatory for entry, award, and retention of this AFSC as defined in AFI 48-123. Physical ability to perform climbing duties and freedom from fear of heights and claustrophobia is mandatory for entry, award, and retention of this AFSC.
IMPLEMENTATION	Entry into training is accomplished by reserving a position in the career field upon entry into the Air Force.

10.2. **Journeyman (5-Level) Training.**

KNOWLEDGE	No additional knowledge requirements.
TRAINING	No AETC training requirement.
EXPERIENCE	Qualification and possession of AFSC 2E632 Experience in functions such as installing, maintaining, and repairing communications cable and antenna systems, including electrical equipment and transmission lines. Completion of the 2E652 Career Development Course Completion of all 2E652 CTG core tasks (See Attachment 3 of the STS for career training guide) Completion of applicable equipment AFJQSs/AFQTPs Completion of all local tasks assigned for the duty position
OTHER	Normal depth perception and normal gait and balance is mandatory for entry, award, and retention of this AFSC as defined in AFI 48-123. Physical ability to perform climbing duties and freedom from fear of heights and claustrophobia is mandatory for entry, award, and retention of this AFSC.
IMPLEMENTATION	Entry into formal upgrade is initiated upon assignment to the individual's first duty station. Qualification training is initiated anytime individuals are assigned duties for which they are not qualified. Use CDCs and AFJQSs/AFQTPs concurrently to obtain the necessary qualification for refresher and cross-utilization training.

10.3. **Craftsman (7-Level) Training.**

KNOWLEDGE	No additional knowledge requirements.
TRAINING	Communications-Electronics Career Advancement Course (In-residence), E3ACR2EX7X 002 (PDS 7SI) [Active Duty only] Communications-Electronics Career Advancement Course (Distance learning), E6ADL2EX7X 000 (PDS Code 4VI) [Guard/Reserve only] Communications-Electronics Career Advancement Course (Self-paced), E6AZS2EX7X 006 (PDS X2J) [Prerequisite for Guard/Reserve members prior to attending the above distance learning course]
EXPERIENCE	Qualification and possession of AFSC 2E652 Experience performing or supervising functions in areas such as project installation and maintenance actions, communications cables and antennas, and related electrical hardware. Completion of all 2E672 CTG core tasks (See Attachment 4 of the STS for career training guide) Completion of AFQTP 2EXXXX-201L, Communications-Electronics Work Center Manager's Handbook Completion of applicable equipment/unit management function AFJQSs/AFQTPs
OTHER	Normal depth perception and normal gait and balance is mandatory for entry, award, and retention of this AFSC as defined in AFI 48-123. Physical ability to perform climbing duties and freedom from fear of heights and claustrophobia is mandatory for entry, award, and retention of this AFSC.
IMPLEMENTATION	Entry into formal upgrade training is initiated when individuals obtain the necessary rank and skill level. Qualification training is initiated anytime an individual is assigned duties for which they are not qualified. Use CDCs and AFJQSs/AFQTPs concurrently to obtain the necessary qualification for refresher and cross-utilization training.

10.4. **Superintendent (9-Level) Training.**

KNOWLEDGE	Maintenance management principles, principles of telephony; electrical and lightwave communications fundamentals, wire and antenna transmission phenomena; and digital telephone switching systems; telephone equipment and data circuitry; cable systems; and antenna systems
TRAINING	No AETC training requirement.
EXPERIENCE	Qualification and possession of AFSC 2E672 Experience is mandatory in supervising installation and maintenance in areas such as telephone switching systems; telephone subsets; telephone key systems and data transmission media systems circuitry; T-carrier; fiber-optic end equipment; modems; multiplexers; line drivers and associated hardware; and cable and antenna systems, including supporting structures, radomes, and transmission lines, and buried, aerial, underground copper core, and fiber-optic C4 cable systems. AFQTP 2EXXXX-201LB, Communications-Electronics Manager's Handbook
OTHER	Eligibility for a Secret security clearance according to AFI 31-501, *Personnel Security Program Management,* is mandatory for award and retention of this AFSC.
IMPLEMENTATION	Entry into OJT is initiated when individuals are selected for the rank of SMSgt. Qualification training is initiated anytime individuals are assigned duties for which they are not qualified.

10.5. Training Sources.

10.5.1. Electronic Principles training - 338 TRS Keesler AFB, MS at https://wwwmil.keesler.af.mil/.

10.5.2. AFSC specific training – 364 TRS, Sheppard AFB, TX. at http://www.sheppard.af.mil/.

10.5.3. 2EX7X Communications-Electronics Career Advancement course (7-Level School) – 338 TRS, Keesler AFB, MS at https://wwwmil.keesler.af.mil/.

10.5.4. CDC 2E652 is available for upgrade purposes through the unit training manager. For individual qualification and cross-utilization training, CDCs are ordered through the unit training office.

10.5.5. AFJQSs/AFQTPs are Air Force publications and are mandatory for use in qualification training. They are developed by the 81 TRSS (Q-Flight), Keesler AFB, MS and may be downloaded from https://wwwmil.keesler.af.mil/81trss/qflight/welcome.html. Procedures for requesting development of AFJQSs/AFQTPs are contained in AFI 36-2233 *Air Force On-the-Job Training Products for Communications-Electronics Enlisted Specialty Training*. AFJQSs/AFQTPs are listed in Part II, Section D, of this CFETP.

10.5.6. Air Force Engineering and Technical Service (AFETS) (course listing found at https://www.afca.scott.af.mil/c-e_maint/afets.htm), Contract Field Service (CFS), and Special Maintenance Team (SMT) training may be requested to provide on-site training. The AFETS program is outlined in AFI 21-110, *Engineering and Technical Services Management and Control*. Direct requests for AFETS, CFS, or SMT training to your MAJCOM.

Section D - Resource Constraints

11. Purpose. This section identifies known resource constraints that preclude optimal/desired training from being developed or conducted, including information such as part numbers, national stock numbers, number of units required, cost, manpower, etc. Included are narrative explanations of each resource constraint and an impact statement describing what effect each constraint has on training. Finally, this section includes actions required, OPR, and target completion date. Resource constraints will be, at a minimum, reviewed and updated annually.

12. Apprentice (3-Level) Training.

12.1. Constraints: None.

12.1.1. Impact. N/A

12.1.2. Resources Required. N/A

12.1.3. Action Required. N/A

12.2. OPR/Target Completion Date. N/A

13. Journeyman (5-Level) Training.

13.1. Constraints: None.

13.1.1. Impact. N/A

13.1.2. Resources Required. N/A

13.1.3. Action Required. N/A

13.2. OPR/Target Completion Date. N/A

14. Craftsman (7-Level) Training.

14.1. Constraints: None.

14.1.1. Impact. N/A

14.1.2. Resources Required. N/A

14.1.3. Action Required. N/A

14.2. OPR/Target Completion Date. N/A

Section E - Transition Training Guide

15. There are currently no transition training requirements. This area is reserved.

PART II

Section A - Specialty Training Standard

1. Implementation. The implementation of training in support of this STS is with the class beginning 20021030 and graduating 20010218.

2. Purpose. As prescribed in AFI 36-2201, this STS:

2.1. The Course Training Standards (CTS) at Attachments 1 and 2:

2.1.1. Establishes the training requirements for airmen to perform 3-skill level duties in the Communications Cable and Antenna Systems career ladder of the Airman Communications-Electronics Systems career field. The training tasks are based on an analysis of duties in AFMAN 36-2108 for AFSC 2E632.

2.1.2. Provides the basis for the development of more detailed training materials, training objectives, and training evaluation instruments for the course.

2.1.3. Shows formal training requirements. Attachment 1 lists the Electronic Principles requirements for this specialty and contains the proficiency code key pertaining to this attachment. Students receive this training through AETC course L3AQR2E632 481.

2.1.4. Attachment 2 contains a list of behavioral statements that describe knowledge and job performance requirements the graduate demonstrates on the job as a result of training received in course J3ABR2E632 007 as described in the Air Force Education and Training Course Announcements (ETCA) database (formerly AFCAT 36-2223, USAF Formal Schools Catalog). Part I, Section D, and the Preface to Attachment 2 explains constraints and/or guidelines to training. When notes or explanations describe constraints in the skill awarding course, they indicate that training on those items is restricted due to the limitation described.

2.2. The Five-Level Career Training Guide (CTG) at Attachment 3:

2.2.1. Provides a complete list of continuation training requirements for the award of AFSC 2E652. Attachment 3 contains the behavioral code key used to indicate the type of training provided by CDCs.

2.2.2. Identifies the mandatory task and knowledge training that is required for the 5-skill level in the Communications Cable and Antenna Systems career field of the Airman Communications-Electronic Systems career ladder. These are based on an analysis of duties and responsibilities as outlined in AFMAN 36-2108.

2.3. The Seven-Level Career Training Guide (CTG) at Attachment 4:

2.3.1. Provides a complete list of continuation training requirements for the award of AFSC 2E672. Attachment 4 contains the behavioral code key used to indicate the type of training that will be provided.

2.3.2. Identifies the mandatory task and knowledge training that is required for the 7-skill level in the Communications Cable and Antenna Systems ladder of the Airman Communications-Electronics Systems career field. These are based on an analysis of duties and responsibilities as outlined in AFMAN 36-2108.

2.4. The CTGs at Attachments 3 and 4:

2.4.1. Provide OJT certification columns to record completion of task and knowledge training requirements. Use automated training management systems to document technician qualifications, if available. Task certification must show a start and stop date.

2.4.2. Become a job qualification standard for OJT when placed in AF Form 623, On-the-Job Training Record, and used according to AFI 36-2201. OJT tasks in column 1 are trained to the go/no go level. Go means the individual can perform the task without assistance and meet local requirements for accuracy, timeliness, and correct use of procedures.

2.4.2.1. Training Documentation. Document and certify completion of training. Identify duty position requirements by circling the subparagraph number next to the task statement. Complete the following columns in Part II of the CFETP:

2.4.2.1.1. Initial Certification. Evaluate qualifications and when verified, certify using:

2.4.2.1.1.1. Core/Critical Tasks. Start date, stop date, trainee's initials, trainer's initials, and certifier's initials.

2.4.2.1.1.2. Non-Core/Non-Critical Tasks. Start date, stop date, trainee's initials, and trainer's initials.

2.4.2.1.2. Transcribing from Old Document to CFETP. Evaluate current qualifications and when verified recertify using:

2.4.2.1.2.1. Tasks Previously Certified and Required in Current Duty Position (Core/Critical Tasks). Current date as completion date, trainee's initials, and certifier's initials.

2.4.2.1.2.2. Tasks Previously Certified and Required in Current Duty Position (Non-Core/Non-Critical Tasks). Current date as completion date, trainee's initials, and trainer's initials.

2.4.2.1.2.3. Tasks Previously Certified but Not Required in Current Duty Position. Carry forward only the previous completion date of certification (not the initials of another person). If and when transcribed tasks become duty position requirements, recertify using standard certification procedures.

2.4.2.1.2.4. The person whose initials appear in the trainer or certifier block during the transcription process must meet the requirements of their prescribed role.

2.4.2.1.2.5. Give the member the old CFETP upon completion of transcription.

2.4.2.1.3. Documenting Career Knowledge. When a CDC is not available: the supervisor identifies STS training references the trainee requires for career knowledge and ensures, as a minimum, that trainees cover the mandatory items in AFMAN 36-2108, *Developing, Managing, and Conducting Training*. For two time CDC course exam failures, supervisors identify all STS items corresponding to the areas covered by the CDC. The trainee completes study of the STS references, undergoes evaluation by the task certifier, and receives certification on the STS. NOTE: Career knowledge must be documented prior to submitting a CDC waiver.

2.4.2.1.4. Decertification and Recertification. When an airman is found to be unqualified on a task previously certified, the supervisor lines through the previous certification or deletes the previous certification when using an automated system. Appropriate remarks are entered on the AF Form 623A, On-The-Job Training Record Continuation Sheet, as to the reason for decertification. The individual is recertified using the normal certification process.

2.4.3. Indicates career knowledge provided in the 5-skill level CDCs. See Air Force Institute for Advanced Distributed Learning (AFIADL) catalog maintained by the unit OJT manager for current CDC listings or go to http://www.maxwell.af.mil/au/afiadl.

2.4.4. Are guides for development of promotion tests used in the Weighted Airman Promotion System (WAPS). Specialty Knowledge Tests (SKT) are developed at the USAF Occupational Measurement Squadron by senior NCOs with extensive practical experience in their career fields. The tests sample knowledge of CTG subject matter areas judged by test development team members to be most appropriate for promotion to higher grades. Questions are based upon study references listed in the WAPS catalog. Individual responsibilities are listed in chapter 1 of AFI 36-2605, *Air Force Military Personnel Testing System.* WAPS is not applicable to the Air National Guard or Air Reserve forces.

3. Recommendations. Comments and recommendations are invited concerning the quality of AETC training. A Training Feedback Hotline (TFH) Training Feedback Line TFH has been installed for the supervisors' convenience. For a quick response to concerns, call TFH at DSN 736-2574, or write us at 364 TRS/TRR 511 9th Ave. Ste 2, Sheppard AFB, TX 76311-2338. Reference this CTS and identify the specific area of concern (paragraph, training standard element, etc).

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

MICHAEL E. ZETTLER, Lieutenant General, USAF
Deputy Chief of Staff /Installations & Logistics

Attachments:
1. Electronic Principles Course Training Standard
2. Course Training Standard, 2E632
3. Five-Level Career Training Guide, 2E652
4. Seven-Level Career Training Guide, 2E672

PREFACE

NOTE 1: Dashed items in this CTS are not part of the original CTS created at the August 1999 Electronic Principles U&TW however, they are the specific objectives taught in the Electronic Principles course designed to meet the CTS requirements.

NOTE 2: Unless otherwise stated, students may be allowed two assists from the instructor and still successfully achieve the proper level of proficiency. An instructor assist is anytime an instructor must intercede to provide guidance to a student which leads to a satisfactory completion of the objective or to prevent the student from continuing in a manner that will lead to an unsatisfactory conclusion, safety violation, or damage to equipment.

NOTE 3: All objectives are trained during wartime.

PROFICIENCY CODE KEY		
	SCALE VALUE	DEFINITION: The individual
Task Performance Levels	1	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)
	2	Can do most parts of the task. Needs help only on hardest parts. (PARTIALLY PROFICIENT)
	3	Can do all parts of the task. Needs only a spot check of completed work. (COMPETENT)
	4	Can do the complete task quickly and accurately. Can tell or show others how to do the task. HIGHLY PROFICIENT)
***Task Knowledge Levels**	a	Can name parts, tools, and simple facts about the task. (NOMENCLATURE)
	b	Can determine step-by-step procedures for doing the task. (PROCEDURES)
	c	Can identify why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)
	d	Can predict, isolate, and resolve problems about the task. (COMPLETE THEORY)
****Subject Knowledge Levels**	A	Can identify basic facts and terms about the subject. (FACTS)
	B	Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
	C	Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
	D	Can evaluate conditions and make proper decisions about the subject. (EVALUATION)

EXPLANATIONS

* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Examples: b and 1b)

** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task or for a subject common to several tasks.

X This mark is used alone instead of a scale value to show that no proficiency training is provided in the course.

\- This mark is used alone in course columns to show that training is required, but not given, due to limitations in resources.

PROFICIENCY CODE

1. ELECTRONIC SUPPORT SUBJECTS.

1.1. Safety. B
- Identify safety precautions pertaining to electronics.

1.2. First Aid. B
- Identify first aid procedures for electrical injuries.

1.3. Electrostatic Discharge (ESD) Control. B
- Identify electrostatic discharge (ESD) sensitive device control methods.

1.4. Electromagnetic Effects (EMP/EMI). B
- Identify the techniques used to protect electronic equipment from the effects of electromagnetics (EMP/EMI).

1.5. Metric Notation.

1.5.1. Powers of Ten. B
- Convert decimal numbers to scientific notation and vice versa.
- Perform math operations of numbers expressed as scientific notation.

1.5.2. Electrical Prefixes. B
- Convert decimal numbers to electrical prefixes and vice versa.
- Convert electrical prefix values to other equivalent electrical prefix values.

2. TEST EQUIPMENT.

2.1. Analog Multimeter. 2b
- Identify the operating principles of the analog multimeter.
- Identify procedures for analog multimeter usage.
- Measure selected electrical values using analog and digital multimeters.

2.2. Digital Multimeter. 2b
- Identify the operating principles of the digital multimeter.
- Identify procedures for digital multimeter usage.
- Measure selected electrical values using analog and digital multimeters.

2.3. Oscilloscope. 2b
- Identify oscilloscope operating principles.
- Identify the procedures for oscilloscope usage.
- Measure selected electrical values using an oscilloscope and signal generator.

2.4. Signal Generator. 2b
- Identify the procedures for signal generator usage.
- Measure selected electrical values using an oscilloscope and signal generator.

PROFICIENCY CODE

3. **BASIC CIRCUITS.**

3.1. Direct Current (DC).

3.1.1. Terms. B
- Identify terms associated with direct current (DC) principles

3.1.2. Theory. B
- Identify circuit schematic symbols.
- Identify basic circuit operating principles.
- Determine the results of parameter changes on DC resistive circuits.
- Identify resistor voltage divider operating principles.

3.1.3. Calculations. B
- Calculate values for a series resistive DC circuit diagram.
- Calculate values for a parallel resistive DC circuit diagram.
- Calculate values for a series-parallel resistive DC circuit diagram.

3.2. Alternating Current (AC).

3.2.1. Terms. B
- Identify terms associated with AC principles.

3.2.2. Calculations. B
- Calculate AC voltage values.
- Calculate AC frequency/time values.

4. BASIC CIRCUIT COMPONENTS.

4.1. Resistors.

4.1.1. Theory. B
- Identify resistor characteristics.

4.1.2. Color Code. B
- Using resistor color code, determine the ohm/tolerance value of resistors.

4.1.3. Troubleshoot. 2b
- Troubleshoot a series-parallel resistive circuit to a faulty resistor.

4.2. Inductors.

4.2.1. Theory. B
- Identify characteristics of inductors.
- Identify inductor DC operating principles.
- Identify inductor AC operating principles.

4.2.2. Troubleshoot. 2b
- Troubleshoot a faulty inductor in a circuit.

PROFICIENCY CODE

4.3. Capacitors.

4.3.1. Theory. B
- Identify characteristics of capacitors.
- Identify capacitor DC operating principles.
- Identify capacitor AC operating principles.

4.3.2. Troubleshoot. 2b
- Troubleshoot a faulty capacitor in circuit.

4.4. Resistive-Capacitive-Inductive (RCL) Circuit Theory.

4.4.1. Basic. B
- Identify RCL circuit operating principles.

4.4.2. Resonant. B
- Identify resonant RCL circuit operating principles.

4.4.3. Frequency Sensitive Filter. B
- Identify frequency sensitive filter operating principles.

5. ELECTROMAGNETIC DEVICES.

5.1. Transformers.

5.1.1. Theory. B
- Identify characteristics of transformers.
- Identify transformer operating principles.

5.1.2. Troubleshoot. 2b
- Troubleshoot a faulty transformer.

5.2. Relays and Solenoids.

5.2.1. Theory. B
- Identify relay and solenoid operating principles.

5.2.2. Troubleshoot Relays. 2b
- Troubleshoot a faulty relay in a circuit.

5.3. Motor Theory.

5.3.1. Direct Current. B
- Identify DC motor operating principles.

5.3.2. Alternating Current. B
- Identify AC motor operating principles.

PROFICIENCY CODE

5.4. Generator Theory.

5.4.1. Direct Current. B
- Identify DC generator operating principles.

5.4.2. Alternating Current. B
- Identify AC generator operating principles.

5.5. Synchro/Servo.

5.5.1. Theory. B
- Identify servo/synchro operating principles.

5.5.2. Fault Isolate. 2b
- Identify servo/synchro fault isolation procedures.

5.6. Transducer Theory. B
- Identify transducer operating principles.

6. SOLID STATE DEVICES.

6.1. Diodes.

6.1.1. Theory. B
- Identify solid state diode operating principles.

6.1.2. Troubleshoot. 2b
- Identify diode fault isolation techniques.
- Troubleshoot a diode circuit.

6.2. Bipolar Junction Transistors.

6.2.1. Theory. B
- Identify bipolar transistor operating principles.

6.2.2. Troubleshoot. 2b
- Troubleshoot a bipolar junction transistor circuit.

6.3. Special Purpose Device Theory.

6.3.1. Zener Diode. B
- Identify zener diode operating principles.

6.3.2. Light Emitting Diode (LED). B
- Identify LED operating principles.

6.3.3. Liquid Crystal Display (LCD). B
- Identify LCD operating principles.

	PROFICIENCY CODE
6.3.4. Integrated Circuits (IC). – Identify integrated circuit (IC) operating principles.	B
6.3.5. Metal Oxide Semiconductor Field Effect Transistor (MOSFET). – Identify MOSFET operating principles.	B
6.3.6. Operational Amplifier (OP AMP). – Identify OP AMP operating principles.	B
7. TRANSISTOR AMPLIFIER CIRCUITS.	
7.1. Theory. – Identify the transistor amplifier configurations. – Identify common emitter amplifier operating principles. – Identify common collector amplifier operating principles. – Identify common base amplifier operating principles.	B
7.2. Stabilization. – Identify transistor amplifier temperature stabilization operating principles.	B
7.3. Coupling. – Identify coupling circuit operating principles.	B
7.4. Troubleshoot. – Troubleshoot a transistor amplifier circuit to a faulty component.	2b
8. POWER SUPPLY CIRCUITS.	
8.1. Theory.	
8.1.1. Rectifiers. – Identify power supply rectifier operating principles.	B
8.1.2. Filters. – Identify power supply filter operating principles.	B
8.1.3. Voltage Regulators. – Identify shunt regulator operating principles. – Identify series electronic voltage regulator (EVR) operating principles.	B
8.2. Troubleshoot. – Identify types of malfunctions in a filtered power supply circuit. – Troubleshoot a filtered power supply circuit to a faulty component. – Troubleshoot a series EVR circuit to a faulty component.	2b

PROFICIENCY CODE

9. WAVE GENERATING CIRCUITS.

9.1. Theory.

9.1.1. Oscillators. B
- Identify the characteristics of oscillator circuits.
- Identify LC oscillator operating principles.
- Identify crystal oscillator operating principles.

9.1.2. Multivibrators. B
- Identify astable multivibrator operating principles.
- Identify monostable multivibrator operating principles.
- Identify bistable multivibrator operating principles.

9.1.3. Waveshaping Circuits. B
- Identify RC integrating/differentiating circuit operating principles.
- Identify sawtooth generator operating principles.

9.2. Fault Isolate. 2b
- Fault isolate a wave generating circuit.

10. DIGITAL NUMBERING SYSTEMS.

- This area not trained.

11. DIGITAL LOGIC CIRCUITS.

- This area not trained.

12. BASIC COMPUTER FUNDAMENTALS.

- This area not trained.

13. BASIC COMMUNICATIONS THEORY.

13.1. Antenna. B
- Identify antenna operating principles.

13.2. Transmission Lines. B
- Identify transmission line theory of operation.

13.3. Waveguides. B
- Identify waveguide operating principles.

13.4. Transmitters.

13.4.1. Amplitude Modulation (AM). B
- Identify AM transmitter operating principles.

13.4.2. Frequency Modulation (FM). B
- Identify FM transmitter operating principles.

	PROFICIENCY CODE
13.5. Receivers.	
13.5.1. AM Receivers. – Identify AM receiver operating principles.	B
13.5.2. FM Receivers. – Identify FM receiver operating principles.	B
14. SOLDER AND DESOLDER.	
14.1. Terminal Connection. – Solder a wire to a terminal connector. – Desolder a wire from a terminal connector.	2b
14.2. Printed Circuit Board (PCB). – Solder three components to a PCB. – Desolder three components from a PCB.	2b
14.3. Multipin Connector. – Solder a tinned wire into a pin for use in a multipin connector. – Desolder a wire from a pin used in a multipin connector.	2b
14.4. Coaxial Connector. – Solder a coaxial connector center contact to a coaxial cable. – Desolder a coaxial connector center contact from a coaxial cable.	2b
15. ASSEMBLE SOLDERLESS CONNECTORS.	
15.1. Crimped Connection. – Splice two wires together using a crimp connector. – Crimp a terminal lug to a wire.	2b
15.2. Coaxial Connector. – Assemble a solderless coaxial cable connector to a coaxial cable.	2b
15.3. Multipin Connector. – Crimp a wire into a pin for use in a multipin connector. – Assemble a multipin connector.	2b

PREFACE

NOTE 1: Unless otherwise stated in the objective, the student may be allowed two assists from the instructor and still successfully achieve the proper level of proficiency. An instructor assist is defined as anytime an instructor must intercede to provide guidance to a student which leads to a satisfactory completion of the objective or to prevent a student from continuing in a manner which will lead to an unsatisfactory conclusion, safety violation, or damage to the equipment. Successful students have performed the task to the satisfaction of the course; however, they may not be capable of meeting the field requirements for speed or accuracy.

NOTE 2: All equipment related objectives are performed by following procedures from technical orders, technical manuals, or student instructional material developed by the training facility. Test equipment used throughout the course includes:

Modular Splicing System
Megohmmeter AN/PSM-2A
MSA Watchman Multigas Monitor
Time Domain Reflectometer (TDR) 1502
2273 Advanced Cable and Fault Locator
Fusion Splicer PFS-200
Test Set 146A
Pressure Monitoring Test Set ST-4066
Optical Verifier OV-1
Dynamometer, 10,000 lbs
Transit
"B" Pressure Testing Gauge
965B Subscriber Loop Analyzer
Time Domain Reflectometer (TDR) 1503
Headset 52EW
Digital Multimeter 8025A
CAT 5 Cable Tester (Pentascanner)
Multimeter Digital Fluke Model 8025B
Optical Time Domain Reflectometer TFP2A
Test Set 91A
Cable Air Dryer (CAD) P-3100
Analog Multimeter AN/PSM-6
Cam Lever Dynamometer
Model 259 Vibraground Test Set

NOTE 3: The equipment items identified below are used as training vehicles within the skill awarding course since it incorporates most of the basic principles and procedures found in the remainder of the AFSC's equipment inventory.

Antenna, HF ROTA, AS-3482/GRC
Tower, GP-1
Tower, Microwave Antenna D-102
Hydraulic Cable Trailer
Construction Vehicle
Tower, 78 ft x 4 ft, AB/216/U
Microwave Dish, D8C-1
Pole Trailer, 5T-ETC
Cable Reel Truck

NOTE 4: All tasks referenced to utilizing a construction vehicle or cable reel truck in this training standard are accomplished with an instructor operating the vehicle

NOTE 5: All objective references are performed as terminal objectives. Knowledge required to perform CTS elements is inherent in each objective. This includes, but is not limited to, defining the capabilities, limitations, and theory of operation of the stated item.

NOTE 6: All objectives preceded by an “*” are trained during wartime.

1. CAREER LADDER PROGRESSION.
TR: AFMAN 36-2108

1.1. Match terms and specialty codes to statements relating to an Airman Communications Cable and Antenna Systems Apprentice.

1.2. Identify the duties performed by each skill level for AFS 2E6X2.

1.3. Identify education and training requirements of the 2E6X2 career field.

2. OPERATIONAL RISK MANAGEMENT (ORM).
TR: AFIND17; TOs 31-10 Series and 31W3-10 Series; AFOSH 91 Series; and OSHA 1926, 2079, 2081, 2201, 2202, 2226, and 2255

2.1. Identify hazards associated with AFSC 2E632.

2.2. Use applicable safety procedures while performing projects and maintenance actions on antenna and cable systems.

2.3. Use applicable safety procedures while performing projects and maintenance actions on buried Hardened Intersite Cable Systems (HICS).

2.4. Perform standard hand signals.

3. GENERAL CABLE SPLICING AND ANTENNA TASKS.
TR: TOs 31-10-3, 31-10-19; 31W3-10-12; 31W3-10-13; 31W3-10-21; 31W3-10-22; 32-1-101; 21M-LGM-30F-2-20-1; TM 11-2262-2; AT&T Standards 634-350-505; 634-355-500; Preform Products Manual 633-620-006

*3.1. Identify the fundamentals of the types and construction of communications cable and antenna systems.

*3.2. Identify the makeup of different types of communication cables.

3.3. Perform an in-line straight splice on a plastic-sheath, plastic-insulated cable using the modular splicing system.

*3.4. Perform a straight splice on a plastic-sheath, plastic-insulated cable using a VS-3 handtool and AMP PIC-A-BOND connectors.

3.5. Perform a bridge splice on a plastic-sheath, plastic-insulated cable using a VS-3 handtool and AMP PIC-A-BOND connectors.

3.6. Perform a butt splice on a plastic-sheath, plastic-insulated cable using a VS-3 handtool and AMP PIC-A-BOND connectors.

3.7. Splice a 12C12 meteorological cable.

*3.8. Splice an RG-216 semi-flexible coaxial cable.

*3.9. Install a connector on a stranded flexible coaxial cable.

3.10. Install a connector on a solid center conductor, semi-flexible coaxial cable.

3.11. Clear cap conductors using the connector method.

3.12. Seal a cable end using a B end cap.

3.13. Seal a cable end using a C end cap.

*3.14. Install a non-pressurized temporary seal over a splice opening using cured rubber (CR) tape.

*3.15. Seal a splice opening using a Preformed stainless steel closure.

*3.16. Repair major sheath damage on a non-pressurized, 25-pair, plastic-sheath cable.

*3.17. Perform a section replacement on a 25-pair plastic-sheath, plastic-insulated cable.

3.18. Identify the procedures to perform a cable count change.

*3.19. Inspect climbing equipment.

*3.20. Adjust climbing equipment.

*3.21. Prepare work area by inspecting poles and surrounding area.

*3.22. Climb an unstepped pole to a height of 21 feet using proper techniques. See Note 6.

*3.23. Climb a stepped pole to a height of 50 feet using proper techniques. See Note 6.

*3.24. Climb a tower to a height of 100 feet using proper techniques. See Note 6.

*3.25. Work aloft on an unstepped pole to a height of 21 feet using required equipment.

*3.26. Work aloft on a stepped pole to a height of 50 feet using proper techniques. See Note 6.

*3.27. Work aloft on a tower to a height of 100 feet using proper techniques. See Note 6.

4. CABLE MAPS, RECORDS, AND DIAGRAMS.
TR: TOs 31W3-10-12, 31W3-10-22, 21M-LGM-30F-2-20-1; AFI 21-404

4.1. Use and update a Communications and Computer Systems Installation Record (CSIR) for a base communications cable distribution system.

4.2. Use and update installation and maintenance records for a LAN/WAN distribution system.

4.3. Use and update an engineering/installation drawing.

*5. CABLE TERMINATION.
TR: TOs 31-10-2, 31-10-7, 31-10-27, 31W3-10-14, 21M-LGM-30F-2-20-1

5.1. Install a tip cable on a main distribution frame (MDF) using distribution rings.

5.2. Terminate conductors on a 700 Series MDF terminal using the wire-wrap method.

5.3. Identify the procedures to stencil an MDF.

5.4. Identify the procedures to install a building protected terminal.

5.5. Install a CAD-6 buried distribution terminal.

5.6. Terminate conductors in a protected terminal using the punch-on method.

5.7. Identify the requirements to mark a terminal.

6. UNDERGROUND CABLE SYSTEMS.
TR: TOs 31-10-3, 31W3-10-12, 31W3-10-13, 21M-LGM-30F-2-20-1; AT&T Standards 620-135-010, 628-200-200, 628-200-202, 649-325-101, 628-200-208, 622-520-100, 632-305-015

*6.1. Place men working signs and manhole guards at specified locations.

*6.2. Test the atmosphere prior to entering a manhole using an MSA Watchman gas detector.

*6.3. Ventilate a manhole using either the natural or forced air method.

*6.4. Monitor the MSA Watchman at required intervals while working in a manhole.

*6.5. Identify the procedures to enter a confined space.

6.6. Identify the procedures to prevent water from entering a manhole.

6.7. Install a continuous duct rod in one conduit through two manhole runs.

6.8. Clean out one conduit through two manhole runs using a winch line and mandrel.

6.9. Install a pull-in line by hand in one conduit through two manhole runs.

*6.10. Install a core hitch on a 100-pair cable.

6.11. Install a cable grip on a 25-pair cable.

*6.12. Install a pulling frame, sheave, and sheave shackle over a manhole opening.

6.13. Identify the procedures to test the length of cable on a reel.

6.14. Identify the procedures to match a specified pulling length of cable to an engineered project drawing.

6.15. Identify the procedures to install a cable rack.

*6.16. Install a cable through two manhole runs with one 90-degree turn using a cable reel truck. See Note 4.

6.17. Remove cable from two manhole runs with one 90-degree turn using a cable reel truck. See Note 4.

6.18. Form a 25-pair cable in a manhole by hand.

6.19. Identify the procedures to form a large cable in a manhole using cable racking jacks.

6.20. Permanently rack a cable in a manhole using lashed cable supports.

6.21. Identify the procedures to install a bonding ribbon in a manhole.

6.22. Bond a stainless steel Preformed closure in a manhole.

6.23. Identify the procedures to install a cable tag on a Preformed closure in a manhole.

6.24. Identify the procedures to install a pressure tag on a Preformed closure in a manhole.

7. BURIED CABLE SYSTEMS.
TR: TOs 31-10-3; 31W3-10 Series, 21M-LGM-30F-2-20-1; AT&T Standards 629-200-206, 629-200-215, 629-020-005; 3M 2273 Manual

7.1. Identify the procedures to obtain an AF Form 103, Base Civil Engineering Work Clearance Request.

*7.2. Locate an existing copper core cable using a 2273 Advanced Cable and Fault Locator.

*7.3. Mark an existing copper core cable using a 2273 Advanced Cable and Fault Locator.

*7.4. Determine the depth of a cable using a 2273 Advanced Cable and Fault Locator.

7.5. Identify the procedures to locate a shielded fiber optic cable using a 2273 Advanced Cable and Fault Locator.

7.6. Identify the procedures to mark a shielded fiber optic cable using a 2273 Advanced Cable and Fault Locator.

*7.7. Identify the procedures to install a copper core cable using the open trench method.

7.8. Identify the procedures to install a copper core cable using the cable plow method.

7.9. Identify the procedures to prepare a trench for a copper core cable placement.

7.10. Identify the procedures to prepare a splice pit for splicing a cable using the single-offset method.

*7.11. Identify the procedures to prepare a splice pit for splicing a cable using the double-offset method.

7.12. Identify the procedures to backfill a cable trench for a base distribution system.

7.13. Identify the procedures to backfill a splice pit for a base distribution system.

7.14. Identify the types of cable route markers.

*7.15. Identify the marking standards of a cable route marker.

*7.16. Identify the placement requirements of a cable route marker.

*7.17. Identify the procedures to place a cable using cable reel jacks.

*7.18. Identify the procedures to place a cable using cable reel stands.

*7.19. Use a hydraulic cable trailer to place a cable reel.

8. CABLE AND ANTENNA TESTING.
TR: TOs 31-1-141-1, 11-6625-201-12, 31W3-10-15, 33A1-4-5-1, 33A1-12-2-1, 33A1-12-607-1, 33A1-12-1155-1, 33A1-12-1198-1, 33A1-12-1300-1, 33A2-12-1155-1, 33A1-12-310-1; AT&T Standard 634-300-050; 3M 965B Manual

8.1. Perform an insulation resistance test on a 50-pair plastic-insulated cable using an AN/PSM-2 Megohmmeter.

8.2. Measure loop resistance on cable pairs using an 8025B Digital Multimeter.

8.3. Test a 25-pair cable for stray voltage using an 8025B Digital Multimeter.

*8.4. Detect cable faults on a non-working cable using a 52EW headset and battery.

8.5. Detect cable faults on a non-working cable using an 8025B Digital Multimeter.

8.6. Detect resistive-type faults on a non-working cable using a 965B DSP Subscriber Loop Analyzer test set.

8.7. Detect splicer's errors on a non-working cable using an 8025B Digital Multimeter.

*8.8. Detect splicer's errors on a non-working cable using a 146A Test Set and a 52EW headset and battery.

8.9. Locate earth return faults in a buried cable using the 2273 Advanced Cable and Fault Locator test set.

8.10. Locate open cable faults using the 965B DSP Subscriber Loop Analyzer test set.

8.11. Locate split pairs using the 965B DSP Subscriber Loop Analyzer test set.

8.12. Locate resistive-type faults on a non-working cable using a 965B DSP Subscriber Loop Analyzer test set.

8.13. Locate cable faults using a 1503 Time Domain Reflectometer (TDR) test set.

8.14. Identify the procedures to measure a station ground using a 259 Vibraground test set.

8.15. Test a coaxial transmission line using a 1502 TDR.

*8.16. Test a coaxial transmission line using a Fluke 8025A Digital Multimeter.

*8.17. Identify the principles of voltage standing wave ratio (VSWR) of an antenna and return loss measurements.

9. FIBER OPTICS.
TR: TOs 31-10-34, 31S11-4-3-1

*9.1. Explain the theory of fiber optic lightwave communication.

9.2. Identify the operating principles of a fiber optic modem.

9.3. Identify the operating principles of a fiber optic multiplexer.

9.4. Identify the characteristics of a loose-tube single mode fiber optic cable.

9.5. Identify the characteristics of a tight-tube single mode fiber optic cable.

9.6. Identify the characteristics of a loose-tube multimode fiber optic cable.

9.7. Identify the characteristics of a tight-tube multimode fiber optic cable.

9.8. Identify metric measurement conversion factors as they relate to a fiber optic system.

9.9. Identify the procedures to install an underground fiber optic innerduct.

9.10. Identify the procedures to install an underground fiber optic cable.

9.11. Identify the procedures to install a buried fiber optic innerduct.

9.12. Identify the procedures to install a buried fiber optic cable using the plow method.

9.13. Identify the procedures to install a buried fiber optic cable using the trench method.

*9.14. Prepare a four-fiber tight-tube cable for splicing.

*9.15. Splice a fiber optic cable using mechanical splices.

*9.16. Splice fibers using a PFS-200 Optical Fusion Splicer.

9.17. Install a Windsorcomm 710 fiber optic splice enclosure.

9.18. Measure the length of a fiber optic cable using a TFP2A optical time domain reflectometer (OTDR).

*9.19. Measure the dB loss of a fiber optic cable using a TFP2A OTDR.

9.20. Measure the dB loss of an optical fiber using an optical power meter.

9.21. Identify the procedures to operate a fiber optic voice communication set.

9.22. Identify the procedures to terminate a fiber optic cable into a patch panel.

*9.23. Arrange fiber optic splices in a splice tray.

*9.24. Install a ST-type connector on a fiber optic cable.

*9.25. Install a SC CAM LITE-type connector on a fiber optic cable.

10. COMMUNICATIONS CABLE AND ANTENNA SYSTEMS COMMON MAINTENANCE PRACTICES.
TR: TOs 31-10-3, 31W3-10-19, 31W3-10-12, 32-1-101, 36A11-18-11-1; TM 11-2262-2; AT&T Standards 627-320-011, 628-200-208; Pelsue System Practices 100-300-100

10.1. Identify the procedures to use a general purpose carrier (GPC) Model 28 Utility Trailer.

10.2. Identify the procedures to use an electrical water pump.

10.3. Identify the procedures to use a mechanical water pump.

10.4. Identify the procedures to use a portable generator.

10.5. Identify the procedures to use a portable blower.

10.6. Identify the procedures to use a portable heater.

10.7. Identify the procedures to use a pneumatic power tool.

10.8. Identify the procedures to use a powder-actuated tool.

10.9. Identify the procedures to use an electric power tool.

*10.10. Identify the most common types of fiber rope.

*10.11. Identify the most common uses of fiber rope.

10.12. Identify the procedures used in caring for fiber rope.

10.13. Identify the most common types of wire rope.

*10.14. Identify the most common uses of wire rope.

*10.15. Identify the procedures used in caring for wire rope.

10.16. Make a short splice in a fiber rope.

*10.17. Make a long splice in a fiber rope.

10.18. Make an eye splice in a fiber rope.

10.19. Make a crown splice in a fiber rope.

10.20. Tie an overhand knot in a fiber rope.

10.21. Tie a square knot in a fiber rope.

*10.22. Tie a bowline-on-a-bight knot in a fiber rope.

10.23. Tie a sheetbend knot in a fiber rope.

*10.24. Tie a bowline knot in a fiber rope.

*10.25. Tie a double bowline knot in a fiber rope.

10.26. Tie an intermediate bowline knot in a fiber rope.

*10.27. Tie a clove hitch in a fiber rope.

10.28. Tie a timber hitch in a fiber rope.

10.29. Tie a snubbing hitch in a fiber rope.

*10.30. Make a rolled eye splice in a wire rope.

*10.31. Use ropes, slings, and proper rigging techniques to install antenna systems.

10.32. Use common hand tools safely to perform construction projects.

10.33. Identify the steps to maintain common hand tools for safe use.

10.34. Use construction tools when performing construction projects.

10.35. Identify the procedures to maintain construction tools.

*10.36. Use rigging techniques to install an underground cable.

*10.37. Load a cable reel using a cable reel truck. See Note 4.

*10.38. Unload a cable reel using a cable reel truck. See Note 4.

10.39. Identify the procedures to position a cable reel to install a buried cable.

10.40. Position a cable reel truck and cable to install an underground cable. See Note 4.

11. CABLE PRESSURIZATION AND HARDENED INTERSITE CABLE SYSTEMS (HICS).
TR: TOs 31-10-3, 31W3-10-19, 31W3-10-12, 11G26-2-8-2, 21M-LGM30F-2-5-7, 21M-LGM-30F-2-20-1, 31W3-10-16; AFCC CEMI 350-18; AT&T Standard 637-235-201; Puregas Manual 3100, Puregas Bulletin 521-2

11.1. Explain the theory of a continuous flow pressure system.

11.2. Explain the theory of a static pressure system.

11.3. Identify the procedures to install a cable air dryer (CAD).

11.4. Identify the procedures to install a meter and alarm panel.

11.5. Identify the procedures to perform a semi-annual preventive maintenance inspection (PMI) on a CAD.

11.6. Identify the procedures to perform an annual PMI on a CAD.

11.7. Identify the procedures to measure cable pressure using a "B" pressure gauge.

11.8. Identify the procedures to determine the approximate location of a pressure leak using a pressure gradient.

11.9. Identify the procedures to test for a pressure leak using the flash test method.

11.10. Identify the methods used to remove moisture from a cable.

11.11. Identify the procedures to adjust a pressure contactor.

11.12. Explain the theory of a HICS pressure monitoring system.

11.13. Identify the procedures to detect an operated HICS pressure transmitter.

11.14. Identify the procedures to locate an operated HICS pressure transmitter.

11.15. Identify the procedures to repair a HICS demi-valve assembly.

11.16. Interpret a HICS system status report from a pressure monitoring receiver-transmitter.

11.17. Perform an in-service splice to replace a pressure boot on a HICS cable.

11.18. Seal a splice opening on a HICS cable using an ATI splice closure.

11.19. Adjust a HICS pressure transmitter.

12. LOCAL AREA NETWORK/WIDE AREA NETWORK (LAN/WAN) DISTRIBUTION SYSTEMS.

TR: Commercial Manuals: EIA/TIA 569, 570, TIA/EIA 568A, 606, 607; TSB 67, TSB 72

12.1. Explain the theory of a multiplexer used in a LAN/WAN distribution system.

12.2. Explain the theory of a modem used in a LAN/WAN distribution system.

12.3. Explain the theory of a router used in a LAN/WAN distribution system.

12.4. Explain the theory of a hub used in a LAN/WAN distribution system.

12.5. Explain the theory of a server used in a LAN/WAN distribution system.

12.6. Identify the STAR topology in a LAN/WAN distribution system.

12.7. Identify the BUS topology in a LAN/WAN distribution system.

12.8. Identify the RING topology in a LAN/WAN distribution system.

12.9. Identify the STAR/RING topology in a LAN/WAN distribution system.

*12.10. Identify how a single mode fiber optic cable is used in a LAN/WAN distribution system.

*12.11. Identify how a multimode fiber optic cable is used in a LAN/WAN distribution system.

*12.12. Identify how a CAT 5 unshielded twisted pair (UTP) cable is used in a LAN/WAN distribution system.

*12.13. Identify how a thin net wiring is used in a LAN/WAN distribution system.

*12.14. Identify the procedures to install a CAT 5 UTP cable in a LAN/WAN distribution system.

*12.15. Identify the procedures to install a fiber optic cable in a LAN/WAN distribution system.

12.16. Identify the procedures to install a multiplexer in a LAN/WAN distribution system.

12.17. Identify the procedures to install a modem in a LAN/WAN distribution system.

*12.18. Identify the procedures to install a horizontal configuration in a LAN/WAN distribution system.

*12.19. Identify the procedures to install a backbone configuration in a LAN/WAN distribution system.

*12.20. Identify the procedures to install a patch panel in a LAN/WAN distribution system.

*12.21. Identify the marking standards for a LAN/WAN distribution system.

12.22. Identify how a color coded marking tag is used in a LAN/WAN distribution system.

12.23. Identify how a grounding tag is used in a LAN/WAN distribution system.

*12.24. Terminate a cable using a 110 block in a LAN/WAN distribution system.

*12.25. Terminate a cable using a RJ-45 flush mount wall jack in a LAN/WAN distribution system.

*12.26. Terminate a cable using a patch panel in a LAN/WAN distribution system.

*12.27. Test the length of a cable in a LAN/WAN distribution system using a CAT 5 cable tester.

*12.28. Test the attenuation of a cable in a LAN/WAN distribution system using a CAT 5 cable tester.

*12.29. Test the near end crosstalk (NEXT) of a cable in a LAN/WAN distribution system using a CAT 5 cable tester.

*12.30. Test the signal return loss (SRL) of a cable in a LAN/WAN distribution system using a CAT 5 cable tester.

12.31. Identify the principles of BIT error rate testing.

*12.32. Identify the procedures to maintain a LAN/WAN distribution system.

13. ANTENNA AND AERIAL SYSTEMS.
TR: TOs 31-1-141 Series, 31-10-3, 31-10-14, 31-10-19, 31-10-21, 31-10-24, 31-10-28, 31R1-2U-111, 31R2-2FRC-131, 31R2-2GRC-1232, 31W3-10-19, 35A34-3 through 7, 36A11-16-14-1

*13.1. Match antenna fundamental terms with definitions on wavelength.

*13.2. Match antenna fundamental terms with definitions on wave velocity.

*13.3. Match antenna fundamental terms with definitions on antenna impedance.

*13.4. Match antenna fundamental terms with definitions on transmission line characteristics.

13.5. Identify how inductance effects wire transmission properties.

13.6. Identify how capacitance effects wire transmission properties.

13.7. Identify how resistance effects wire transmission properties.

13.8. Identify how total impedance effects wire transmission properties.

*13.9. Match an antenna's physical characteristics to the proper antenna.

13.10. Match an antenna's frequency characteristics to the proper antenna.

*13.11. Load an antenna support pole using a construction vehicle. See Note 4.

*13.12. Unload an antenna support pole using a construction vehicle. See Note 4.

*13.13. Identify the procedures to transport antenna support poles.

13.14. Identify the procedures to dig a hole using power equipment.

13.15. Identify the procedures to install a pole step.

13.16. Identify the procedures to install a pole depth marker.

*13.17. Erect a support pole using a construction vehicle. See Note 4.

13.18. Remove a support pole using a construction vehicle. See Note 4.

13.19. Identify the procedures to remove a support pole using a crane.

*13.20. Fabricate a permanent support guy.

13.21. Install a temporary support guy.

*13.22. Install a permanent support guy.

13.23. Remove a temporary support guy.

13.24. Remove a permanent support guy.

13.25. Identify the procedures to install continuous lightning protection.

13.26. Install non-continuous lightning protection.

*13.27. Install a self-supporting GP-1 tower using a floating gin pole.

13.28. Remove a self-supporting GP-1 tower using a floating gin pole.

13.29. Identify the procedures to install a self-supporting GP-1 tower using a construction vehicle.

13.30. Identify the procedures to remove a self-supporting GP-1 tower using a construction vehicle.

*13.31. Identify the procedures to assemble an AS-3482 rotatable antenna.

13.32. Identify the procedures to disassemble an AS-3482 rotatable antenna.

13.33. Rig an AS-3482 rotatable antenna for lowering.

*13.34. Rig an AS-3482 rotatable antenna for raising.

13.35. Lower an AS-3482 rotatable antenna approximately ten feet.

*13.36. Raise an AS-3482 rotatable antenna approximately ten feet.

13.37. Install an AB-216/U guyed antenna support using a floating gin pole.

13.38. Remove an AB-216/U guyed antenna support using a floating gin pole.

13.39. Identify the procedures to install an AB-216/U guyed antenna support using a construction vehicle. See Note 4.

13.40. Identify the procedures to remove an AB-216/U guyed antenna support using a construction vehicle. See Note 4.

*13.41. Plumb an antenna support using a transit.

13.42. Identify the procedures to plumb an antenna support using a plumb bob.

13.43. Identify the procedures to maintain poles.

13.44. Identify the procedures to maintain guys.

13.45. Identify the procedures to maintain anchors.

*13.46. Identify the procedures to install hazard markings.

13.47. Identify the procedures to maintain hazard markings.

13.48. Inventory material for a GP-1 tower.

13.49. Identify the obstruction-marking requirements when installing an AB-216/U tower.

*13.50. Identify the procedures to install a safety climb device.

13.51. Site anchor locations using a transit.

13.52. Remove a six-foot or larger parabolic dish on a D-102 tower using a construction vehicle. See Note 4.

*13.53. Install a six-foot or larger parabolic dish on a D-102 tower using a construction vehicle. See Note 4.

13.54. Remove antenna support hardware on a six-foot or larger parabolic dish.

*13.55. Install antenna support hardware on a six-foot or larger parabolic dish.

*13.56. Align two six-foot or larger parabolic dishes located on D-102 towers.

13.57. Identify the procedures to install a ground reflecting system.

*13.58. Unload cable reels on an RTPT-14 cable trailer.

*13.59. Load cable reels on an RTPT-14 cable trailer.

*13.60. Identify the procedures to install flexible coaxial cable.

13.61. Identify the procedures to remove flexible coaxial cable.

13.62. Remove an aerial run of semi-flexible coaxial cable.

*13.63. Install an aerial run of semi-flexible coaxial cable.

13.64. Remove an elliptical waveguide.

*13.65. Install an elliptical waveguide.

*13.66. Identify the procedures to pressurize an antenna transmission line.

*13.67. Install a connector on an elliptical waveguide.

13.68. Remove a connector on an elliptical waveguide.

13.69. Identify the principles of an aerial cable system.

13.70. Install two spans of suspension messenger on an existing pole line.

13.71. Remove two spans of suspension messenger on an existing pole line.

13.72. Lash two spans of aerial cable using a lashing machine and cable guide.

*13.73. Install cable supports on two spans of aerial cable.

13.74. Remove two spans of aerial cable and associated hardware.

14. ANTENNA SYSTEMS MAINTENANCE.
TR: AFOSH 91 Series; TOs 31-1-141 Series, 31-10 Series, 33A1-15-39-1; Applicable Tech Data

14.1. Perform a scheduled PMI on a transmission line.

14.2. Perform a scheduled PMI on an AS-3482 antenna.

14.3. Identify the procedures to perform a scheduled PMI on a GP-1 support tower.

14.4. Identify the procedures to perform a six foot or larger parabolic dish reflector.

BEHAVIORAL FORMAT CTG CODING SYSTEM

Each CTG element is written as a behavioral statement. The detail of the statement and verb selection reflects the level of training provided.

Code	Definition
A	Subject Knowledge Level - Can identify basic facts and terms about the subject. (FACTS)
B	Subject Knowledge Level - Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
C	Subject Knowledge Level - Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
D	Subject Knowledge Level - Can evaluate conditions and make proper decisions about the subject. (EVALUATION)
-	When this code is used in the OJT Upgrade Column it indicates that the certification or qualification on this task is a local determination. When this code is used in the CDC Column it indicates that no training for this subject is provided in the CDCs.
X	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level. This code indicates that training to satisfy this requirement is either provided through OJT, CDCs, or a combination of OJT and CDCs.
X*	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level if the assigned duty position is responsible to maintain/operate the equipment or system indicated as assigned by the local work center supervisor. This code indicates that training to satisfy this requirement is normally provided through OJT.

CDC column. The use of proficiency coding indicates the level of knowledge training provided by the CDCs, The CDC column will now identify the subject knowledge level covered in the CDC. The “K” will no longer be used to identify the knowledge covered in the CDC. Information pertaining to the meaning of the code can be located in the CTG coding system table.

CFETP versus AFJQS task coding. AFJQSs/AFQTPs annotated in the CFETP with an “X” denotes the AFJQS is mandatory. Within the AFJQS are individual tasks that are coded either “X” or “X*”. If the tasks are coded “X,” they are mandatory. If coded “X*,” they are duty position specific.

The identification blocks listed below are to be used when the trainer is other than the trainee's immediate supervisor.

THIS BLOCK IS FOR IDENTIFICATION PURPOSES ONLY Personal Data - Privacy Act of 1974		
PRINTED NAME OF TRAINEE *(Last, First, Middle Initial)*	INITIALS *(Written)*	SSAN
PRINTED NAME OF CERTIFYING OFFICIAL AND WRITTEN INITIALS		
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	

PREFACE

NOTE 1: Users are responsible for annotating technical references to identify current references pending CTG revision.

NOTE 2: AFJQS 2EXXX-200B, 2EXXX C-E Enlisted Specialty Training is mandatory for use in conjunction with this CTG. It sets the Air Force standard for qualification and certification for the following subject areas:

Career Progression Information
Information Security (INFOSEC)
Communications Security (COMSEC)
Protect MAJCOM/FOA Critical Mission Information
Physical Security
Electronic Emission Security (TEMPEST)
Electronic Warfare
Operational Risk Management
Training
Work Center Administration
Operator Care of Assigned Government Vehicles
Supply
Technical Orders (TO) and Technical Publications
Supervision
C-E Equipment Maintenance Management
C-E Equipment Maintenance System Inspecting, Reporting, and Forms

NOTE 3: Equipment/system knowledge and/or performance tasks are defined in the AFJQS. AFJQS items set the standard for qualification and certification and are mandatory for use in conjunction with this CTG. AFQTPs listed in the CTG are generally handbooks which do not have task listings, therefore tracking through the Core Automated Maintenance System (CAMS) is not possible. Annotate completion of these products on AF Form 623A.

NOTE 4: When an AFJQS is loaded into CAMS, letters in the AFJQS identifier are converted to the number representing each letter's alphabetical position (e.g., 200B would be loaded as 200.2). To save space, individual AFJQS tasks are not normally listed within the CTG. However, if a CTG task is closely related to an AFJQS task or area, the AFJQS task/heading is listed (e.g., 200.2.12) and the related CTG task is listed under it (e.g., 200.2.12.75). To prevent potential task numbering conflicts between AFJQS tasks and subordinate CTG tasks, subordinate CTG tasks start with the number 75. This creates gaps in the final task numbering sequence, but integrates related CTG and AFJQS tasks so they will be listed on your training documents in the same area and in order.

NOTE 5: When loading AFJQS tasks into the CAMS database, tasks are loaded as STS not 797 items.

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
1. ELECTRONIC PRINCIPLES (EP). TR: EP CBT and TO 31-1-141 Series							
1.1. Identify principles and capabilities of electronic devices and circuits.	-	B					
2. TEST EQUIPMENT. TR: TO 33K-1-100, Applicable test equipment technical orders							
2.1. Identify principles, capabilities, and limitations of the following test equipment items:	-	B					
2.1.1. Analog oscilloscope.	-	B					
2.1.2. Digital oscilloscope.	-	B					
2.1.3. Spectrum analyzer.	-	B					
2.1.4. Analog multimeter.	-	B					
2.1.5. Digital multimeter.	-	B					
2.1.6. Power meter.	-	B					
2.1.7. Optical time domain reflectometer (OTDR).	-	B					
2.1.8. Time domain reflectometer (TDR).	-	B					
2.1.9. Bit error rate test set.	-	B					
2.1.10. RF signal generator.	-	B					
2.1.11. Frequency counter.	-	B					
2.1.12. Oscilloscope.	-	B					
2.1.13. Power meter/light source.	-	B					
2.1.14. 1502 TDR.	-	B					
2.1.15. 1503 TDR.	-	B					
2.1.16. Cable fault locator.	-	B					
2.1.17. Cable open/split locator.	-	A					
2.1.18. Cable locator.	-	A					
2.1.19. Atmosphere tester.	-	A					
2.1.20. Vibraground.	-	A					
2.1.21. Microscope.	-	A					
2.1.22. Pressure gauge.	-	A					
2.1.23. Tone generator set.	-	A					
2.1.24. Amplifiers.	-	A					
2.1.25. Dynamometer.	-	A					
2.1.26. Transit.	-	A					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
2.1.27. Splicer's headset.	-	A					
2.1.28. RF Bridge.	-	A					
2.1.29. Tracking generator.	-	A					
2.1.30. Wattmeter.	-	A					
2.1.31. Fiber optic voice communications set.	-	A					
2.2. Perform equipment maintenance using the following test equipment/devices:							
2.2.1. Oscilloscope.	-	-					
2.2.2. Spectrum analyzer.	-	-					
2.2.3. Analog multimeter.	X*	-					
2.2.4. Digital multimeter.	X*	-					
2.2.5. Power meter/light source.	X*	-					
2.2.6. OTDR.	X*	-					
2.2.7. TDR.	X*	-					
2.2.8. 1502 TDR.	X*	-					
2.2.9. 1503 TDR.	X*	-					
2.2.10. Bit error-rate tester.	-	-					
2.2.11. Signal generator.	-	-					
2.2.12. Cable fault locator.	X*	-					
2.2.13. Cable open/split locator.	X*	-					
2.2.14. Cable locator.	X*	-					
2.2.15. Atmosphere tester.	X*	-					
2.2.16. Ultrasonic leak detector.	-	-					
2.2.17. Vibraground.	-	-					
2.2.18. Microscope.	-	-					
2.2.19. Pressure gauge.	X*	-					
2.2.20. Tone generator set.	-	-					
2.2.21. Amplifiers.	-	-					
2.2.22. Dynamometer.	X*	-					
2.2.23. Transit.	-	-					
2.2.24. Splicer's headset.	X*	-					
2.2.25. Pressure monitor test set.	-	-					
2.2.26. RF Bridge.	-	-					
2.2.27. Tracking generator.	-	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
2.2.28. Wattmeter.	X*	-					
2.2.29. Chart recorder.	-	-					
2.2.30. Field strength meter.	-	-					
2.2.31. Fiber optic voice communication set.	-	-					
3. STANDARD MAINTENANCE PRACTICES.							
3.1. Describe basic troubleshooting procedures.	X*	-					
3.2. Interpret results of diagnostic programs.	X*	-					
3.3. Interpret diagrams for fault isolation.	X*	-					
3.4. Locate elements such as unit, module, row, column, component, pin, connector, or test point using alphanumeric designator.	X*	-					
3.5. Solder and desolder electronic equipment components.	X*	-					
4. COMPUTER SECURITY (COMPUSEC). TR: AFI 33-202 and AFQTP 2EXXX-202D							
4.1. Define COMPUSEC.	X	-					
4.2. Identify vulnerabilities and incidents.	X	-					
4.3. Describe data protection techniques.	X	-					
4.4. Describe basic countermeasures.	X	-					
4.5. Describe reporting procedures.	X	-					
4.6. Explain malicious logic.	X	-					
4.7. Describe methods of malicious logic protection.	X	-					
4.8. Describe TEMPEST suppression techniques.	X*	-					
4.9. Perform TEMPEST maintenance.	X*	-					
5. STANDARD INSTALLATION PRACTICES. TR: TOs 31-10-7, 31-10-11, 31-10-13, 31-10-24, 31W-3-6, 31W-1-102, 31W2-4-330 series, and 31W3-10-20; TIA/EIA-568A & 569; AFI 32-1065; AFJQS 2EXXX-202B							
5.1. State facts related to the following practices:							
5.1.1. Installation.	X	A					
5.1.2. Configuration.	X	A					
5.1.3. Interconnection.	X	A					
5.1.4. Inspection.	X	A					
5.2. Describe cable labeling and installation documentation.	X	A					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
5.3. Describe wire color coding standards.	X*	A					
5.4. Describe fiber optics installation concepts.	X*	A					
5.5. Describe the concepts of:							
5.5.1. Grounding.	X	A					
5.5.2. Bonding.	X	A					
5.5.3. Shielding.	X	A					
5.5.4. Lightning protection.	X	A					
5.6. Remove or install equipment grounds.	X*	-					
5.7. Check quality of equipment grounds.	X*	-					
5.8. Identify procedures to terminate multi-conductor cables.	X*	-					
5.9. Construct the following cable connectors:							
5.9.1. Multi pin.	X*	-					
5.9.2. Modular.	X*	-					
5.9.3. Coaxial.	X*	-					
5.9.4. Fiber.	X*	-					
5.10. Isolate and repair malfunctions in cable assemblies.	X*	-					
6. COMMUNICATIONS PRINCIPLES. TR: TO 31-1-141 Series							
6.1. State facts relating to the following:							
6.1.1. Amplitude Modulation (AM).	-	B					
6.1.2. Frequency Modulation (FM).	-	B					
6.1.3. Phase Modulation (PM).	-	B					
6.1.4. Pulse Code Modulation (PCM).	-	B					
6.1.5. Bandwidth.	-	B					
6.1.6. Lightwave communications.	-	B					
6.1.7. Asynchronous/synchronous communication modes.	-	B					
6.1.8. Error detection and correction.	-	B					
6.2. State facts relating to the theory of operation of the following interface standards and protocols:							
6.2.1. EIA/RS-232C.	-	B					
6.2.2. EIA/RS-449.	-	B					
6.2.3. EIA/RS-422.	-	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
6.2.4. EIA/RS-423.	-	B					
6.2.5. EIA-530.	-	B					
6.2.6. EIA-568.	-	B					
6.2.7. V.35.	-	B					
6.2.8. MIL STD 188-114A.	-	B					
6.2.9. TCP/IP. TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBTs: Microsoft TCP/IP on Windows NT 4.0; Introduction to TCP/IP and IP Addressing	-	-					
6.2.10. X.25/1822.	-	-					
6.2.11. GOSIP.	-	-					
6.3. State facts relating to the theory of operation of communication protocols/addressing. TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBTs: Introduction to Common Networking Protocols and Internetworking Overview	-	-					
6.4. State facts relating to the following switching methods: TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBT: WAN Technologies							
6.4.1. Circuit.	-	-					
6.4.2. Message.	-	-					
6.4.3. Packet.	-	-					
6.4.4. Asynchronous transfer mode (ATM). TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBT: WAN Technologies; ATM Principles	-	-					
6.5. State facts relating to the following multiplexing methods: TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBTs Data Communications, Signals and Systems; WAN Technologies							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
6.5.1. Frequency Division Multiplexing (FDM).	-	-					
6.5.2. Time Division Multiplexing (TDM).	-	-					
6.5.3. T1 rate and higher.	-	-					
6.6. State facts relating to the following cryptology methods:							
6.6.1. Secret key/symmetrical (traditional cryptographic equipment).	-	-					
6.6.2. Public key/asymmetrical (FORTEZZA).	-	-					
7. INFORMATION TRANSPORT CONCEPTS.							
7.1. State facts relating to the theory of operation of the following network configurations: TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBTs: LAN Fundamentals; LAN Technologies and LAN Topologies and Techniques							
7.1.1. Network topologies (Star, Ring, Bus, etc.).	X	-					
7.1.2. Network types (LAN, WAN, VPN).	X	-					
7.2. State facts relating to the theory of operation of the following information transport devices: TR: http://usaf.smartforce.com/ NCC Training Tracks/Communications-Electronics Maintenance Technician; CBTs: Fundamentals of Internetworking and LAN Media and Components							
7.2.1. Routers.	X	-					
7.2.2. Hubs (concentrators).	X	-					
7.2.3. Bridges.	X	-					
7.2.4. Gateways.	X	-					
7.2.5. Switches.	X	-					
7.2.6. Data terminal equipment (DTE).	X	-					
7.2.7. Data communications equipment (DCE).							
7.2.7.1. Modems.	X	-					
7.2.7.2. Data service units/channel service units (DSU/CSU).	X	-					
7.2.8. Multiplexers.	X	-					
7.2.9. Network interface card	X	-					
7.2.10. Common encryption devices used in AF and DOD communication networks.	-	-					
7.2.11. Integrated Digital Network Exchange (IDNX).	-	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
8. EXPEDITIONARY COMMUNICATIONS CONCEPTS. TR: https://aefcenter.acc.af.mil							
8.1. Identify basic concepts of the Aerospace Expeditionary Force (AEF) deployment process. TR: AFI 10-400, Chap 1 thru 3	X	B					
8.2. Explain basic concepts of Unit Type Codes (UTC) and Force Packaging as it relates to the AEF tasking process. TR: AFMAN 10-401, Chap 4 thru 6; http://www.fas.org/man/dod-101/usaf/docs/cwpc/4200-FO.htm	X	B					
8.3. Describe deployment procedures. TR: AFMAN 10-100; MAJCOM and Local Directives							
8.3.1. Pre-deployment.	X	B					
8.3.2. Employment.	X	B					
8.3.3. Post deployment.	X	B					
8.3.4. Recovery.	X	B					
8.4. Identify deployable communications systems associated with this AFSC.	X	A					
8.5. Accomplish the following mobility procedures: TR: Applicable MAJCOM directives; TOs 00-20-series							
8.5.1. Pre-deployment inspections.	X*	-					
8.5.2. Air mobility equipment preparation.	X*	-					
8.5.3. Road mobility equipment preparation.	X*	-					
8.5.4. Post-deployment turn around.	X*	-					
9. ELECTRICAL POWER SYSTEMS.							
9.1. Describe the application of the following types of uninterruptible power supplies:							
9.1.1. Batteries. TR: AFJQS 3E0X2-214D, Module 1	X*	-					
9.1.2. Switched electrical power systems. TR: AFQTP 3E0X2-213YA, Modules 1 and 2	X*	-					
9.2. Describe the application of the following types of generators:							
9.2.1. Fixed.	X*	-					
9.2.2. Mobile/tactical.	X*	-					
9.2.3. 60 Hertz.	X*	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
9.2.4. 400 Hertz.	X*	-					
9.3. Describe commercial power requirements.	X*	-					
9.4. Describe power phasing requirements.	X*	-					
10. DESCRIBE CORE FUNCTIONS OF AFSC 2E6X2							
10.1. Engineering and Installation (E&I)	X	A					
10.2. Cable Antenna Maintenance	X	A					
10.3. HICS	X	A					
11. CABLE AND ANTENNA SYSTEMS FUNDAMENTALS. TR: TOs 21M-LGM-30F-2-20-1, 31W3-10 Series, 31-10 Series							
11.1. Identify cable plant classification.	X	A					
11.2. Identify cable composition.	X	A					
11.3. Identify conductor identification.	X	A					
11.4. Identify general aerial cable construction fundamentals.	X	A					
11.5. Explain the following antenna fundamentals:							
11.5.1. Wave propagation.	X	A					
11.5.2. Wave length.	X	A					
11.5.3. Wave velocity.	X	A					
11.5.4. Antenna impedance.	X	A					
11.5.5. Transmission line characteristics.	X	A					
11.6. Identify physical characteristics of antennas.	X	A					
11.7. Identify frequency characteristics of antennas.	X	A					
12. CABLE SPLICING. TR: TOs 21M-LGM-30F-2-20-1, 31W3-10 Series, 31-10 Series							
12.1. Splice cables using modular splicing system.	X*	B					
12.2. Splice plastic-sheath plastic-insulated cable to include a:							
12.2.1. Straight splice.	X*	B					
12.2.2. Bridge splice.	X*	B					
12.2.3. Butt splice.	X*	B					
12.3. Splice the following cables to include a:							
12.3.1. Filled cable.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
12.3.2. Video cable.	-	B					
12.3.3. Meteorological cable.		B					
12.3.4. Hardened Intersite Cable System (HICS) cable.	X*	-					
12.3.5. Coaxial cable.	-	B					
12.4. Splice fiber optic cable by:							
12.4.1. Setting up splice point.	X*	B					
12.4.2. Mechanical splice method.	X*	B					
12.4.3. Fusion splice method.	X*	B					
12.5. Install fiber optic splice closures.	X*	B					
12.6. Clear cap conductors.	X*	B					
12.7. Make a cable section replacement.	-	B					
12.8. Make a cable transfer.	-	B					
12.9. Prepare a HICS cable section/link cable.	X*	-					
12.10. Perform a HICS in-service/out-of-service cable replacement.	X*	-					
12.11. Make cable count changes.	-	B					
12.12. Splice-in load coils.	-	B					
12.13. Splice-in capacitors.	-	B					
12.14. Splice-in span line repeaters.	-	B					
12.15. Install temporary bonds.	X*	B					
13. CABLE SEALING. TR: TOs 31W3-10-12, 31W3-10-13, 31W3-10-21, 21M-LGM-30F-2-20-1							
13.1. Seal cable ends.	X*	B					
13.2. Install temporary seals on a splice opening.	X*	B					
13.3. Seal cable using the stainless steel closure method.	X*	B					
13.4. Repair/replace HICS terminal splice cases.	X*	-					
13.5. Repair/replace HICS installed splice cases.	X*	-					
13.6. Repair damaged sheath on:							
13.6.1. Plastic cable.	X*	B					
13.6.2. HICS cable.	X*	-					
14. CABLE TERMINATION. TR: TOs 31-10-2, 31-10-7, 31-10-27, 31W3-10-14, 21M-LGM-30F-2-20-1							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
14.1. Install main distribution frame (MDF).	-	B					
14.2. Install central office stubbed protectors.	-	B					
14.3. Install central office unstubbed protectors.	-	B					
14.4. Install tip cables.	-	B					
14.5. Terminate conductors on an MDF.	-	B					
14.6. Stencil an MDF with the proper information.	-	B					
14.7. Install protected terminals and housings in:							
14.7.1. Buried distribution systems.	-	B					
14.7.2. Aerial distribution systems.	-	B					
14.7.3. Building distribution systems.	-	B					
14.8. Terminate cable on protected terminals in:							
14.8.1. Buried distribution systems.	-	B					
14.8.2. Aerial distribution systems.	-	B					
14.8.3. Building distribution systems.	-	B					
14.9. Terminate fiber optic cable using:							
14.9.1. Splicer support shelf/patch panel.	X*	B					
14.9.2. Splice tray configuration.	X*	B					
14.10. Install connectors on fiber optic cable to include:							
14.10.1. Epoxy connectors.	X*	B					
14.10.2. Crimped connectors.	X*	B					
14.11. Tag terminals with the proper information.	X*	B					
14.12. Stencil terminals with the proper information.	X*	B					
14.13. Maintain HICS termination equipment:							
14.13.1. Checkout/replace electrical surge arrestor (ESA).	X*	-					
14.13.2. Checkout/replace audio and horn alarm ESAs.	X*	-					
14.13.3. Checkout/replace high energy spark gaps.	X*	-					
14.13.4. Replace terminal boards.	X*	-					
14.14. Perform terminating techniques using the:							
14.14.1. Mechanical method.	-	B					
14.14.2. Wire wrap method.	-	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
15. AERIAL CABLE SYSTEMS. TR: TOs 31-1-141 Series, 31-10-3, 31-10-14, 31-10-24, 31W3-10-12, 31W3-10-13, 31W3-10-19, 31W3-10-21, 31R1-2U-111, 31R2-2FRC-131, 31R2-2GRC-1232, 35A34-3 through 7, 36A11-16-14-1; EIDR-700-7							
15.1. Stake out a pole line.	-	B					
15.2. Dig holes for poles using:							
15.2.1. Hand tools.	X*	B					
15.2.2. Power equipment.	X*	B					
15.3. Prepare poles for installation by:							
15.3.1. Inspecting.	-	B					
15.3.2. Loading.	-	B					
15.3.3. Transporting.	-	B					
15.3.4. Unloading.	-	B					
15.3.5. Installing depth markers.	-	B					
15.3.6. Installing steps.	-	B					
15.3.7. Installing lightning protection.	-	B					
15.4. Install poles using the construction vehicle (crane, low-pro, mid-pro) method.	-	B					
15.5. Install anchors of the following types:							
15.5.1. Patent.	X*	B					
15.5.2. Non-patent.	-	B					
15.6. Fabricate and install the following antenna support guys:							
15.6.1. Temporary.	X*	B					
15.6.2. Permanent.	X*	B					
15.7. Remove poles using the:							
15.7.1. Construction vehicle (crane, low-pro, mid-pro) method.	X*	B					
15.7.2. Jack and pullover method.	X*	B					
15.7.3. Pole derrick and pole jack method.	X*	B					
15.8. Prepare work area by inspecting poles and surrounding area.	X*	B					
15.9. Climb and work aloft on:							
15.9.1. Unstepped poles.	X*	B					
15.9.2. Stepped poles.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
15.9.3. Ladders.	-	B					
15.9.4. Towers.	X*	B					
15.10. Secure tools and equipment at working height.	X*	B					
15.11. Install suspension strand.	-	B					
15.12. Test suspension strand for correct tension using a dynamometer.	-	B					
15.13. Test suspension strand using the two people method.	-	B					
15.14. Remove suspension strand.	-	B					
15.15. Install the following cables:							
15.15.1. Copper core.	-	B					
15.15.2. Fiber optic.	-	B					
15.15.3. Coaxial.							
15.15.3.1. Flexible.	-	B					
15.15.3.2. Semi-flexible.	-	B					
15.15.3.3. Rigid.	-	B					
15.16. Remove the following cables:							
15.16.1. Copper core.	-	B					
15.16.2. Fiber optic.	-	B					
15.16.3. Coaxial.							
15.16.3.1. Flexible.	-	B					
15.16.3.2. Semi-flexible.	-	B					
15.16.3.3. Rigid.	-	B					
15.17. Install cable supports.	-	B					
15.18. Use transit.	-	B					
15.19. Perform standard construction hand signals.	X*	B					
15.20. Prepare antenna support towers for installation by:							
15.20.1. Loading.	-	B					
15.20.2. Transporting.	-	B					
15.20.3. Unloading.	-	B					
15.21. Install self-supporting antenna supports using a:							
15.21.1. Floating gin pole.	-	B					
15.21.2. Construction vehicle (crane, low-pro, mid-pro).	X*	B					
15.22. Remove self-supporting antenna supports using a:							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
15.22.1. Floating gin pole.	-	B					
15.22.2. Construction vehicle (crane, low-pro, mid-pro).	X*	B					
15.23. Install guyed antenna supports using a:							
15.23.1. Fixed gin pole.	-	B					
15.23.2. Floating gin pole.	-	B					
15.23.3. Construction vehicle (crane, low-pro, mid-pro).	X*	B					
15.24. Remove guyed antenna supports using a:							
15.24.1. Fixed gin pole.	-	B					
15.24.2. Floating gin pole.	-	B					
15.24.3. Construction vehicle (crane, low-pro, mid-pro).	X*	B					
15.25. Plumb antenna supports using the:							
15.25.1. Transit method.	X*	B					
15.25.2. Plumb bob method.	X*	B					
15.26. Lay out steel tower materials for inventory.	X*	B					
15.27. Install obstruction lighting systems.	X*	B					
15.28. Maintain obstruction lighting systems.	X*	B					
15.29. Determine specifications for obstruction markings.	-	A					
15.30. Install radomes.	-	B					
15.31. Maintain radomes.	-	B					
15.32. Remove radomes.	-	B					
15.33. Assemble rotatable antennas.	-	B					
15.34. Raise rotatable antennas.	-	B					
15.35. Lower rotatable antennas.	-	B					
15.36. Disassemble rotatable antennas.	-	B					
15.37. Install safety climb devices.	-	B					
15.38. Rig rotatable antennas for lowering.	-	B					
15.39. Rig rotatable antennas for raising.	-	B					
16. UNDERGROUND CABLE SYSTEMS. TR: TOs 31-10-3, 31W3-10-12, 31W3-10-13, 21M-LGM-30F-2-20-1							
16.1. Prepare subterranean work area by:							
16.1.1. Placing warning devices.	X*	B					
16.1.2. Testing subterranean atmosphere.	X*	B					
16.1.3. Identifying manhole classification.	X*	A					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
16.1.4. Preventing entrance of water.	X*	B					
16.1.5. Ventilating subterranean structures.	X*	B					
16.1.6. Setting up ground tents.	X*	-					
16.2. Rod cable ducts.	-	B					
16.3. Clean cable ducts.	-	B					
16.4. Install pulling-in rope.	-	B					
16.5. Prepare cable ends for pulling using a:							
16.5.1. Core hitch.	X*	B					
16.5.2. Cable grip.	X*	B					
16.6. Prepare cable-pulling apparatus at manhole opening.	-	B					
16.7. Test length of cable on individual reels to ensure they match pulling lengths on engineered project drawings.	-	B					
16.8. Install cable racks.	-	B					
16.9. Install copper core cable.	-	B					
16.10. Remove copper core cable.	-	B					
16.11. Install fiber optic cable.	-	B					
16.12. Remove fiber optic cable.	-	B					
16.13. Form cable in subterranean structures by:							
16.13.1. Hand.	-	B					
16.13.2. Using cable jacks.	-	B					
16.13.3. Using bending springs.	-	B					
16.14. Rack cable in subterranean structures using the:							
16.14.1. Permanent method.	-	B					
16.14.2. Temporary method.	-	B					
16.15. Install bonding ribbon in subterranean structures.	-	B					
16.16. Bond cable in subterranean structures.	-	B					
16.17. Tag cable in subterranean structures.	X	B					
16.18. Maintain HICS grounding and sealing devices.	X*	-					
17. BURIED CABLE SYSTEMS. TR: TOs 31W3-10-12, 31W3-10-13, 21M-LGM-30F-2-20-1							
17.1. Mark buried cable path prior to digging.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
17.2. Obtain an AF Form 103 clearance permit through Base Civil Engineering (BCE) prior to digging.	X*	A					
17.3. Locate existing buried cables using test equipment.	X*	B					
17.4. Excavate cable.	-	B					
17.5. Set up cable for splicing.	X*	B					
17.6. Set up a ground tent.	X*	B					
17.7. Protect cable plant.	-	B					
17.8. Perform HICS excavation/backfill operations.	X*	-					
17.9. Prepare splice pit and trench for:							
17.9.1. Copper core cable.	X*	B					
17.9.2. Fiber optic cable.	X*	B					
17.9.3. HICS cable.	X*	-					
17.10. Backfill splice pits and trenches using the:							
17.10.1. Manual method.	X*	B					
17.10.2. Mechanical method.	X*	B					
17.11. Install cables using the:							
17.11.1. Manual method.	X*	B					
17.11.2. Mechanical method.	X*	B					
17.12. Install buried cables to include:							
17.12.1. Copper core.	X*	B					
17.12.2. Meteorological.	X*	B					
17.12.3. HICS.	X*	-					
17.12.4. Video.	X*	B					
17.12.5. Coaxial:							
17.12.5.1. Flexible.	X*	B					
17.12.5.2. Semi-flexible.	X*	B					
17.12.6. Control cable.	-	B					
17.12.7. Fiber optic.	X*	B					
17.13. Install cable markers.	X*	B					
18. FIBER OPTICS. TR: TO 31-10-34							
18.1. Explain the operating principles of the following fiber optic system's end equipment:							
18.1.1. Modems.	X*	A					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
18.1.2. Multiplexers.	X*	A					
18.1.3. Explain the make-up of the following fiber optic cable types:							
18.1.3.1. Single mode fibers:							
18.1.3.1.1. Tight-tube.	X	A					
18.1.3.1.2. Loose-tube.	X	A					
18.1.3.2. Multimode fibers:							
18.1.3.2.1. Tight-tube.	X	A					
18.1.3.2.2. Loose-tube.	X	A					
18.2. Test cables using:							
18.2.1. OTDR.	X*	B					
18.2.2. Optical power meter.	X*	B					
19. CABLE TESTING. TR: TOs 31-1-141-1, 11-6625-201-12, 33A1-12-1300-1, 33A2-12-1155-1, 33A1-12-310-1							
19.1. Explain wire transmission principles.	X	A					
19.2. Measure insulation resistance using a megohmmeter.	X*	B					
19.3. Use a multimeter to measure:							
19.3.1. Loop resistance.	X*	B					
19.3.2. Stray voltage.	X*	B					
19.4. Detect cable faults using a:							
19.4.1. Splicer's headset and battery.	X*	B					
19.4.2. Multimeter.	X*	B					
19.4.3. Cable fault locator.	X*	B					
19.4.4. Modular test set.	-	B					
19.5. Detect splicer’s errors using a:							
19.5.1. Splicer's headset and battery.	X*	B					
19.5.2. Multimeter.	X*	B					
19.5.3. Tone set.	X*	B					
19.5.4. Modular test set.	-	B					
19.6. Identify conductors in non-working cable using a:							
19.6.1. Splicer's headset and battery.	X*	B					
19.6.2. Multimeter.	X*	B					
19.6.3. Tone set.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
19.7. Identify conductors in working cable using a:							
19.7.1. Tone set and amplifier.	-	B					
19.7.2. Multimeter.	X*	B					
19.8. Locate cable faults using a:							
19.8.1. Tone set, exploring coil, and amplifier.	-	B					
19.8.2. Fault locator.	X*	B					
19.8.3. Open fault locator.	X*	B					
19.8.4. TDR.	X*	B					
19.9. Identify types of splice errors.	X	A					
19.10. Test span line repeaters.	-	B					
19.11. Replace span line repeaters.	-	B					
19.12. Troubleshoot HICS electrical faults.	X*	-					
19.13. Measure resistance of station grounds.	-	B					
19.14. Record station ground test data on applicable forms.	-	B					
19.15. Troubleshoot fiber optic end equipment to include:							
19.15.1. Modems.	-	B					
19.15.2. Multiplexers.	-	B					
19.16. Replace fiber optic end equipment to include:							
19.16.1. Modems.	-	B					
19.16.2. Multiplexers.	-	B					
20. CABLE PRESSURE SYSTEM. TR: TOs 21M-LGM30F-2-20-1, 21M-LGM30F-2-5-7, 31W3-10-16; AFCA CEMI 350-18							
20.1. Explain the theory of HICS pressure monitoring systems.	X*	B					
20.2. Explain the theory of continuous flow and static pressure systems.	X	A					
20.3. Pressurize antenna transmission lines in aerial, underground, and buried cable systems by:							
20.3.1. Installing a cable air dryer (CAD).	-	-					
20.3.2. Installing a temporary pressure source.	-	B					
20.4. Install pressure plugs using the:							
20.4.1. Injection method.	-	B					
20.4.2. Pour method.	-	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
20.5. Install plastic pressure fittings.	-	B					
20.6. Install a meter panel.	-	-					
20.7. Maintain cable pressure systems by:							
20.7.1. Performing CAD Preventive Maintenance Inspections (PMI).	X*	-					
20.7.2. Removing and replacing CADs.	-	-					
20.7.3. Interpreting meter panel readings.	X*	B					
20.7.4. Recording airflow consumption.	X*	B					
20.7.5. Maintaining stored cables.	X*	B					
20.8. Locate leaks using:							
20.8.1. Gradients.	-	-					
20.8.2. Flash test method.	X*	B					
20.9. Eliminate moisture in cable using the:							
20.9.1. Purging method.	-	B					
20.9.2. Heated dry air method.	-	B					
20.10. Repair HICS demi-valve assembly.	X*	-					
20.11. Troubleshoot HICS pneumatic faults.	-	-					
20.12. HICS Pressure Monitor Receiver Transmitter (PMRT) System:							
20.12.1. Address and adjust pressure transmitters.	X*	-					
20.12.2. Perform pressure transmitter checkout from Missile Alert Facility (MAF).	X*	-					
20.12.3. Perform PMRT access and system initialization.	X*	-					
20.12.4. Perform examination/manual scan of PT circuits.	X*	-					
20.12.5. Perform PMRT program loading and recording.	-	-					
21. LOCAL AREA NETWORK/WIDE AREA NETWORK (LAN/WAN) DISTRIBUTION SYSTEMS. TR: Commercial Manuals, EIA/TIA 569, 570; TIA/EIA 568A, 606, 607, TSB 67, TSB 72							
21.1. Explain the theory of the following LAN/WAN distribution systems:							
21.1.1. Topology of LAN/WAN distribution systems.	X	A					
21.1.2. Use of multiplexers in LAN/WAN distribution systems.	X	A					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
21.1.3. Use of modems in LAN/WAN distribution systems.	X	A					
21.1.4. Use of routers, hubs, and servers in LAN/WAN distribution systems.	X	A					
21.2. Identify the following types of LAN/WAN transmission media:							
21.2.1. Single mode fiber optics.	X	A					
21.2.2. Multimode fiber optics.	X	A					
21.2.3. CAT 5 (intra-building wiring).	X	A					
21.2.4. Thin net wiring.	X	A					
21.3. Install LAN/WAN distribution systems to include:							
21.3.1. Multiplexers.	-	B					
21.3.2. Modems.	-	B					
21.3.3. Single mode fiber optics.	X*	B					
21.3.4. Multimode fiber optics.	X*	B					
21.3.5. CAT 5 (intra-building wiring).	X*	B					
21.3.6. Patch panels and associated hardware.	X*	B					
21.4. Maintain LAN/WAN distribution systems to include:							
21.4.1. Multiplexers.	-	B					
21.4.2. Modems.	-	B					
21.4.3. Single mode fiber optics.	X*	B					
21.4.4. Multimode fiber optics.	X*	B					
21.4.5. Patch panels and associated hardware.	X*	B					
21.4.6. CAT 5 (intra-building wiring).	X*	B					
21.4.7. Thin net wiring.	X*	B					
21.5. Terminate LAN/WAN cables by:							
21.5.1. Installing twisted pair connectors.	X*	B					
21.5.2. Installing thin net connectors.	X*	B					
21.5.3. Installing work area outlets.	X*	B					
21.5.4. Fabricating patch cords.	X*	B					
22. OPERATE AND MAINTAIN SPECIAL PURPOSE VEHICLES. TR: AFI 77-2; AFI 91- Series; TOs 00-20B-5, 36A11-16-1-101, 36A11-16-13-2, 36A11-16-014-1, 36A12-19-7-2							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
22.1. Identify driver safety practices.	X	-					
22.2. Inspect for proper configuration of tools, parts, and materials.	X*	-					
22.3. Identify the purpose and use of special purpose/construction vehicles.	X*	A					
22.4. Perform operator maintenance on special purpose vehicles and accessories to include:							
22.4.1. Line trucks:							
22.4.1.1. Low profile.	X*	-					
22.4.1.2. Cable reel truck.	X*	-					
22.4.2. Trenchers.	X*	-					
22.4.3. Cable trailers:							
22.4.3.1. Hydraulic.	X*	-					
22.4.3.2. Non-hydraulic.	X*	-					
22.4.4. Forklift.	-	-					
22.4.5. Backhoes.	X*	-					
22.4.6. Pole trailers.	-	-					
22.4.7. Tractor and trailer.	-	-					
22.4.8. Cable plow.	X*	-					
22.4.9. Combination pole and cable trailer.	-	-					
22.4.10. Fiber optic splicing trailer.	X*	-					
22.5. Operate special purpose vehicles and accessories to include:							
22.5.1. Line truck:							
22.5.1.1. Low profile.	-	-					
22.5.1.2. Cable reel truck.	-	-					
22.5.2. Trenchers.	-	-					
22.5.3. Cable trailers:							
22.5.3.1. Hydraulic.	-	-					
22.5.3.2. Non-hydraulic.	-	-					
22.5.4. Forklifts.	-	-					
22.5.5. Backhoes.	-	-					
22.5.6. Pole trailers.	-	-					
22.5.7. Tractor and trailers.	-	-					
22.5.8. Cable plows.	-	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
22.5.9. Combination pole and cable trailer.	-	-					
221.5.10. Fiber optic splicing trailer.	-	-					
23. CABLE AND ANTENNA SYSTEMS COMMON MAINTENANCE PRACTICES. TR: TOs 21M-LGM30F-2-20; 31-10-3, 31W3-10-19, 31W3-10-12, 31W-3-10-21, 36A11-18-11-1; AFOSH 91-50							
23.1. Utilize auxiliary equipment to include:							
23.1.1. General-purpose carrier.	-	-					
23.1.2. Water pumps:							
23.1.2.1. Electrical.	-	-					
23.1.2.2. Mechanical.	-	-					
23.1.3. Generators.	-	-					
23.1.4. Blowers.	-	-					
23.1.5. Heaters.	-	-					
23.2. Use power actuated tools to include:							
23.2.1. Pneumatic.	-	-					
23.2.2. Powder.	-	-					
23.2.3. Electric.	-	-					
23.3. Identify the types of fiber ropes.	X	A					
23.4. Explain how to care for fiber ropes.	X	A					
23.5. Explain how fiber ropes are used in this AFS.	X	A					
23.6. Splice fiber ropes.	X	A					
23.7. Tie knots in fiber ropes.	X	B					
23.8. Tie hitches in fiber ropes.	X	B					
23.9. Make a rolled eye splice in a wire rope.	X*	B					
23.10. Use rigging techniques to install antenna and cable systems.	X*	B					
23.11. Load and unload cable reels.	X*	B					
23.12. Position cable reels for:							
23.12.1. Aerial construction.	X*	B					
23.12.2. Buried construction.	X*	B					
23.12.3. Underground construction.	X*	B					
23.12.4. Cable reel jacks.	X*	B					
23.12.5. Cable reel stands.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
23.12.6. Cable trailer.	X*	B					
23.13. Identify the purpose and use of common hand tools.	X	A					
23.14. Identify the purpose and use of construction tools.	-	B					
23.15. Maintain construction tools.	-	B					
23.16. Identify purpose of construction equipment.	-	B					
23.17. Maintain construction equipment.	-	B					
23.18. Maintain circuit identification and recording system (CIRS).	X*	-					
24. ICBM CABLE AFFAIRS. TR: TO 21M-LGM30F-2-20-1; AFI 21-116 and 21-404							
24.1. HICS hardness and integrity:							
24.1.1. Track/manage activities affecting the HICS right-of-way (ROW).	-	-					
24.1.2. Identify HICS easement/route for crossing/construction activities.	-	-					
24.1.3. Monitor and inspect crossings/construction activities on the HICS ROW.	-	-					
24.2. Cable affairs records:							
24.2.1. Maintain landowner/non-USAF agency mailing lists.	-	-					
24.2.2. Maintain landowner/non-USAF agency database records.	-	-					
24.2.3. Maintain HICS CIRS.	-	-					
24.2.4. Maintain/update HICS ROW records:							
24.2.4.1. Tract files.	-	-					
24.2.4.2. Project files.	-	-					
24.2.4.3. Splice/junction history records.	-	-					
24.3. HICS ROW surveillance program:							
24.3.1. Manage surveillance program.	-	-					
24.3.2. Ensure inspection results are documented.	-	-					
24.4. HICS ROW projects and repair actions:							
24.4.1. Perform site survey and determine required corrective actions.	-	-					
24.4.2. Request BCE HICS ROW project/repair assistance as required.	-	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
24.4.3. Process HICS ROW project/repair funding MAJCOM requests.	-	-					
24.4.4. Process HICS ROW project/repair depot level support requests.	-	-					
24.4.5. Inspect completed project/repair actions.	-	-					
24.5. Identify HICS installation criteria:							
24.5.1. Construction guidelines.	-	-					
24.5.2. Siting criteria.	-	-					
25. ANTENNA SYSTEMS. TR: TOs 31-1-141 Series, 31-10-14, 31-10-24, 31R2-2GRC-1232, 31-10-3							
25.1. Use a transit to:							
25.1.1. Site anchor locations.	X*	B					
25.1.2. Establish datum lines.	X*	B					
25.2. Install the following antenna components:							
25.2.1. Radiators.	X*	B					
25.2.2. Reflectors.	X*	B					
25.2.3. Rotator controls.	X*	B					
25.2.4. Azimuth controls.	X*	B					
25.2.5. Mechanical controls.	X*	B					
25.2.6. Antenna support hardware.	X*	B					
25.3. Align reflectors.	X*	B					
25.4. Maintain antenna components:							
25.4.1. Radiators.	X*	B					
25.4.2. Reflectors.	X*	B					
25.4.3. Rotator controls.	X*	B					
25.4.4. Azimuth controls.	X*	B					
25.4.5. Mechanical controls.	X*	B					
25.4.6. Antenna support hardware.	X*	B					
25.5. Remove the following antenna components:							
25.5.1. Radiators.	X*	B					
25.5.2. Reflectors.	X*	B					
25.5.3. Rotator controls.	X*	B					
25.5.4. Azimuth controls.	X*	B					
25.5.5. Mechanical controls.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
25.5.6. Antenna support hardware.	X*	B					
25.6. Install antenna ground reflector systems.	-	B					
25.7. Install open wire transmission lines.	-	B					
25.8. Maintain open wire transmission lines.	-	B					
26. ANTENNA SYSTEMS INSTALLATION AND MAINTENANCE. TR: AFR 33 Series; AFOSH 91 Series; TOs 31-1-141 Series, 31-10 Series, 33A1-15-39-1, Applicable Technical Data							
26.1. Maintain RF coaxial cables:							
26.1.1. Flexible.	X*	B					
26.1.2. Semi-flexible.	X*	B					
26.1.3. Rigid.	-	-					
26.2. Install connectors on:							
26.2.1. Flexible coaxial cable.	X*	B					
26.2.2. Semi-flexible coaxial cable.	X*	B					
26.2.3. Flexible waveguide.	X*	B					
26.3. Install waveguides:							
26.3.1. Flexible.	X*	B					
26.3.2. Rigid.	-	-					
26.4. Maintain waveguides:							
26.4.1. Flexible.	X*	B					
26.4.2. Rigid.	-	-					
26.5. Remove waveguides:							
26.5.1. Flexible.	X*	B					
26.5.2. Rigid.	-	-					
26.6. Perform scheduled PMIs on:							
26.6.1. Coaxial cables.	X*	B					
26.6.2. Antennas.	X*	B					
26.6.3. Support structures.	X*	B					
26.6.4. Antenna hardware.	X*	B					
26.6.5. Grounding systems.	X*	B					
26.7. Use project support documentation and CSIRs to:							
26.7.1. Install antenna systems.	X*	A					
26.7.2. Maintain antenna systems.	X*	A					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
200. AIR FORCE JOB QUALIFICATIONS STANDARDS APPLICABLE TO AFSC 2E6X2. TR: AFI 21-116, 36-2233, CFETP 2E6X2 (See Notes 3 and 4)							
200.2. AFJQS 2EXXX-200B, 2EXXX C-E Enlisted Specialty Training. (See Note 2)	X						
201.3. AFJQS 2EXXX-201C, Corrosion Prevention and Control.	X						
201.5. AFJQS 2EXXX-201E, Communications-Electronics (C-E) Core Automated Maintenance System (CAMS).	X*						
201.7. AFJQS 2EXXX-201G, Maintenance Support.	X*						
201.8. AFJQS 2EXXX-201H, Work Center Deficiency/Discrepancy Reporting.	X*						
201.10. AFJQS 2EXXX-201J, Maintenance Training Program.	X*						
201.16. AFJQS 2EXXX-201P, Work Center Test Equipment Management.	X*						
201.24. AFJQS 2EXXX-201X, E&I Quality Assurance.	X*						
202.1. AFQTP 2EXXX-202A, Electrostatic Discharge Familiarization Handbook.	X*						
202.2. AFJQS 2EXXX-202B, SIPT Electronics and Inside Plant (E&I).	X*						
202.3. AFJQS 2E6X2-202C, EI Standard Installation Practices – Construction/Antenna.	X*						
202.6.2. AFJQS 2E6X2-202FB, Reach-All DD-140 Antenna Tower Vehicle (E&I).	X*						
203.13. AFJQS 2EXXX-203M, Missile Facility Penetration.	X*						
208.10. AFJQS 2E6X2-208J, Parabolic Antenna Installation.	X*						
210.3. AFJQS 2E6X2-210C, AS-3482/GRC Heavyweight Antenna.	X*						
210.4. AFJQS 2E6X2-210D, UHF/VHF Antenna Maintenance.	X*						
210.6. AFJQS 2E6X2-210F, 437C Monopole Antenna System.	X*						
210.7. AFJQS 2E6X2-210G, Cable Systems Installation.	X*						
210.14. AFJQS 2E6X2-210N, Telephone Cable Systems Testing.	X*						

BEHAVIORAL FORMAT CTG CODING SYSTEM

Each CTG element is written as a behavioral statement. The detail of the statement and verb selection reflects the level of training provided.

Code	Definition
A	Subject Knowledge Level - Can identify basic facts and terms about the subject. (FACTS)
B	Subject Knowledge Level - Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
C	Subject Knowledge Level - Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
D	Subject Knowledge Level - Can evaluate conditions and make proper decisions about the subject. (EVALUATION)
-	When this code is used in the OJT Upgrade Column it indicates that the certification or qualification on this task is a local determination. When this code is used in the CDC Column it indicates that no training for this subject is provided in the CDCs.
X	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level. This code indicates that training to satisfy this requirement is either provided through OJT, CDCs, CBTs or a combination of OJT, CDCs and CBTs.
X*	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level if the assigned duty position is responsible to maintain/operate the equipment or system indicated as assigned by the local work center supervisor. This code indicates that training to satisfy this requirement is normally provided through OJT.

CDC column. The use of proficiency coding indicates the level of knowledge training provided by the CDCs, The CDC column will now identify the subject knowledge level covered in the CDC. The “K” will no longer be used to identify the knowledge covered in the CDC. Information pertaining to the meaning of the code can be located in the CTG coding system table.

CFETP versus AFJQS task coding. AFJQSs/AFQTPs annotated in the CFETP with an “X” denotes the AFJQS is mandatory. Within the AFJQS are individual tasks that are coded either “X” or “X*”. If the tasks are coded “X,” they are mandatory. If coded “X*,” they are duty position specific.

The identification blocks listed below are to be used when the trainer is other than the trainee's immediate supervisor.

THIS BLOCK IS FOR IDENTIFICATION PURPOSES ONLY Personal Data - Privacy Act of 1974		
PRINTED NAME OF TRAINEE *(Last, First, Middle Initial)*	INITIALS *(Written)*	SSAN
PRINTED NAME OF CERTIFYING OFFICIAL AND WRITTEN INITIALS		
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	7-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
70. DEPLOYMENT CONCEPTS.							
70.1. Deployment Plans. TR: AFI 10-401							
70.1.1. Describe the purpose of the following:							
70.1.1.1. OPLAN communications requirements.	X	-					
70.1.1.2. Time Phased Force Deployment Document (TPFDD).	X	-					
70.1.1.3. Unit readiness reporting procedures.	X	-					
70.1.1.4. Report UTC status to command authorities.	X	-					
70.2. Unit Type Code (UTC) Development and Reporting. TR: AFMAN 10-401							
70.2.1. Identify UTC development process.	X	-					
70.2.2. Identify UTC adjustment procedures.	X	-					
70.3. Deployment Procedures. TR: AFIs 10-403, 33-211; and 21-109; AFMAN 23-110							
70.3.1. Develop load plan.	X*	-					
70.3.2. Explain pallet build-up procedures.	X*	-					
70.3.3. Explain hazardous cargo preparation.	X*	-					
70.3.4. Prepare documentation.	X*	-					
70.3.5. Determine site selection requirements.	X*	-					
70.3.6. Determine site preparation requirements.	X*	-					
70.3.7. Determine site configuration requirements.	X*	-					
70.3.8. Determine requirements for constructing deployment site utility grids.	X*	-					
70.3.9. Describe control of COMSEC material.	X*	-					
71. SYSTEM PLANNING AND IMPLEMENTATION. TR: AFI 33-104 and AFI 21-404; TO 32-series; AFQTP 2EXXX-202B							
71.1. Identify systems support requirements for new or modified systems.	X	-					
71.2. Describe how to manage planning and implementation of new systems.	X	-					
72. State facts relating to the following work center management principles. TR: AFQTP 2EXXX-201L							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	7-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
72.1. Principles of management.	X						
72.2. Training.	X						
72.3. Supply.	X						
72.4. Core Automated Maintenance System (CAMS).	X						
72.5. Work center management.	X						
72.6. Safety and security.	X						
72.7. Maintenance standards.	X						
72.8. Performance reports.	X						
72.9. Awards and recognition.	X						
72.10. Mobility/deployment.	X						
72.11. Manpower.	X						
72.12. Financial management.	X						
72.13. Publications management	X						

Section B - Course Objective List

4. This section not used.

Section C - Support Materials

5. The following is a list of available support materials.

5.1. **Computer Based Training Products.** Air Force computer based training products can be found at http://usaf.smartforce.com.

5.2. **Air Force Job Qualification Standards and Air Force Qualification Training Packages**

5.2.1. Refer to AFIND8, Numerical Index of Specialty Education/Training Publications, for the list of published AFJQSs/AFQTPs or download these products from https://wwwmil.keesler.af.mil/81trss/qflight/welcome.html. Refer to AFI 36-2233, *Air Force On-the-Job Training Products for Communications-Electronics Enlisted Specialty Training*, for information on how to request development of AFJQSs/AFQTPs.

5.2.2. AFJQSs/AFQTPs applicable to AFSC 2E6X2:

Publication No.	Pseudo Code	Publication Title
AFJQS 2E6X1-202C	2E6X1-202.3	EI Standard Installation Practices - Construction/Antenna
AFJQS 2E6X1-208J	2E6X1-208.10	Parabolic Antennas
AFJQS 2E6X2-210C	2E6X1-210.3	AS-3482/GRC Heavyweight Antenna
AFJQS 2E6X2-210D	2E6X1-210.4	UHF/VHF Antenna Maintenance
AFJQS 2E6X1-210F	2E6X1-210.6	437C Monopole Antenna System
AFJQS 2E6X2-202FB	2E6X2-202.6.2	Reach-all DD-140 Antenna Tower Vehicle (E&I)
AFJQS 2E6X2-210G	2E6X2-210.7	Cable Systems Installation
AFJQS 2E6X2-210N	2E6X2-210.14	Telephone Cable Systems Testing

5.2.3. Additional AFJQS/AFQTP maintenance management and generic training products applicable to this specialty.

Publication No.	Pseudo Code	Publication Title
AFJQS 2EXXX-200B	2EXXX-200.2	2EXXX C-E Enlisted Specialty Training
AFJQS 2EXXX-201C	2EXXX-201.3	Corrosion Prevention and Control
AFJQS 2EXXX-201E	2EXXX-201.5	Communications-Electronics (C-E) Core Automated Maintenance System
AFJQS 2EXXX-201G	2EXXX-201.7	Maintenance Support
AFJQS 2EXXX-201H	2EXXX-201.8	Work Center Deficiency/Discrepancy Reporting
AFJQS 2EXXX-201J	2EXXX-201.10	Maintenance Training Program
AFQTP 2EXXX-201L	2EXXX-201.12	Communications-Electronics (C-E) Work Center Manager's Handbook
AFQTP 2EXXX-201LB	2EXXX-201.12.2	Communications-Electronic (C-E) Manager's Handbook
AFJQS 2EXXX-201P	2EXXX-201.16	Work Center Test Equipment Management
AFJQS 2EXXX-201X	2EXXX-201.24	Engineering Installation (EI) Quality Assurance
AFQTP 2EXXX-202A	2EXXX-202.1	Electrostatic Discharge Familiarization Handbook
AFJQS 2EXXX-202B	2EXXX-202.2	SIPT Electronics and Inside Plant (E&I)
AFQTP 2EXXX-203M	2EXXX-203.13	Missile Facility Penetration
AFQTP 3E0X2-213YA	3E0X2-213.25.1	Solid State Uniterruptible Power System Principles
AFJQS 3E0X2-214D	3E0X2-214.4	Stationary Battery Banks
AFJQS 2EXXX-209C	2EXXX-209.3	6KNZF: C-E Airfield and Weather Systems Support
AFJQS 2EXXX-209D	2EXXX-209.4.	6KNZE: C-E SATCOM/Wideband Augmentation
AFJQS 2EXXX-209L	2EXXX-209.12	6KNZL: C-E METNAV Operations Maintenance
AFJQS 2EXXX-209P	2EXXX-209.16	6KNZG: C-E C-2 Radio System Support

Publication No.	Pseudo Code	Publication Title
AFJQS 2EXXX-209Q	2EXXX-209.17	6KNZN: C-E Personal Wireless Communications (PWCS) Support
AFJQS 2EXXX-209W	2EXXX-209.	6KNZK: C-E Tactical Telephone Switching Systems Support
AFJQS 2EXXX-210S	2EXXX-210.19	6KNZ7: C-E Base Communications Systems Support
AFJQS 2EXXX-209C	2EXXX-209.3	6KNZP: C-E Airfield and Weather Systems Support

Section D - Training Course Index

6. The following is a list of the available Air Force in-residence, field, and/or exportable training courses.

6.1. **Air Force In-Residence Courses.** For information on all formal courses, refer to the Air Force Education and Training Course Announcements (ETCA) database, formerly AFCAT 36-2223, USAF Formal Schools Catalog at https://etca.randolph.af.mil/

Course Number	Course Title	Location
J3ABR2E632 007	Communications Cable and Antenna Systems Apprentice	Sheppard
J3AZR2E652 007	Fiber Optic Cable Installation, Splicing, and Maintenance	Sheppard
J3AZR2E652 009	Antenna Maintenance Transition	Sheppard
J3AZR2E652 010	Cable Maintenance Transition	Sheppard

6.2. **Air Force Engineering Technical Services (AFETS) Training.** For a listing of AFETS courses, refer to the *Catalog of Communications-Electronics Air Force Engineering and Technical Services Courses.* This catalog is revised annually and is available through your MAJCOM's C-E MATAG Working Group representative or can be downloaded from https://www.afca.scott.af.mil/c-e_maint/afets.htm.

Section E - MAJCOM Unique Requirements

7. There are currently no MAJCOM unique requirements. This area is reserved.